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Charlotte Ellis of the Sandia Mountains

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"The poetry of history does not consist of imagination, but of imagination pursuing the fact and fastening upon it. The dead were and are not. Their place knows them no more and is ours today. Yet they were once as real as we, and we shall tomorrow be shadows like them."

—George Macauley Trevelyan, FRS (1876-1962)

In This Issue —

- Charlotte Ellis 1
- Plant Reports 39

THE REMARKABLE NATURALIST Theodore Dru Alison Cockerell (1866-1948) began his professional scientific career as Curator of the Public Museum in Kingston, Jamaica in 1891. After two years, his tuberculosis, which he contracted in 1887, recurred, and he determined he needed to leave the moist climate of Jamaica. Having spent time in Colorado in order to effect an initial cure of his tuberculosis, Cockerell wished he could return to the Rocky Mountains. It so happened that he was in correspondence with C.H.T. Townsend, then at the New Mexico College of Agriculture and Mechanical Arts (NMCA & MA). Cockerell casually suggested that he and Townsend exchange positions. Amazingly Townsend agreed. Cockerell spent the years from 1893 to 1900 at Mesilla Park (now Las Cruces) NM. He then spent three years at New Mexico Normal University in Las Vegas NM before moving to Colorado, where he spent the rest of his career.

In 1937, Cockerell penned an article in the obscure journal *Bios* entitled "Recollections of a Naturalist IV. The Amateur Botanist." He, from his youth, had a fascination with the genus *Primula*. In his article, he tells an absorbing tale of the discovery of a new *Primula* in New Mexico as evidenced by the following excerpt:

It was in connection with the genus *Primula* that I made the acquaintance of another great botanist. When I lived in New Mexico, Miss Charlotte Ellis, one of my students, found a beautiful *Primula* in the Sandia Mountains and as it appeared to be new, it was named *Primula ellisiae* (Pollard & Cockerell, 1902). In the Mogollon Mountains, about 160 miles away, on the other side of the Rio Grande Valley, there was a related species, *Primula rusbyi* (Greene, 1881). Pax and Kunth, apparently without seeing *P. ellisiae*, reduced it to a synonym of *P. rusbyi* in their revision of *Primula* (1905). This did not seem satisfactory, but for a time nothing could be done about it. Sir Isaac Bayley Balfour, the head of the Edinburgh Botanical Garden, was the most learned expert on *Primula*, and had a very large collection of living plants. I sent him seed of *P. ellisiae*, and he procured seed of *P. rusbyi* from another source. In 1921, when my wife and I visited the Edinburgh Garden, Bayley Balfour had brought both species to flowering, and it was a dramatic moment when he stood before us, with a pot in each hand, and pointed out that the living plants were quite distinct. It seems extraordinary to have to go to Edinburgh to settle a point in the botany of New Mexico, no one in that State having seen both plants alive.

Now, in 2008, *Primula ellisiae* and *P. rusbyi* are recognized as distinct species. Charlotte's collection in 1900 is the holotype¹ (US) of *P. ellisiae*. She also collected the holotype (US) of the white shooting star, *Dodecatheon ellisiae* (Standley 1913). She developed relationships not only with Cockerell, but also with Elmer Ottis Wootton and Paul Carpenter Standley. Despite much adversity, she collected hundreds of specimens and helped to define the flora of New Mexico.

Charlotte Cortlandt Ellis (1874 - 1956)

George Cortlandt Ellis was born in Indiana on February 17, 1845, even though the Ellis family roots were in Syracuse, New York. When George Cortlandt was four, his father, George Clinton Ellis, died. In 1850 George, his younger sister and his mother Eliza Carter Ellis were living in Brooklyn, New York with Eliza's parents. After the death of her father in 1860, Eliza and her two children moved to Racine, Wisconsin

Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus

just north of Chicago. While in his teens young George contracted tuberculosis. In spite of his health, in 1862 he volunteered for the New York Regiment of the Union Army and went to war. When the war ended, he returned to the Chicago area and entered the business world. He met Julia Gardell Shipman there and they were married on October 7, 1869. Their first child Guy Carter Ellis was born on September 13, 1870, in Wilmington Illinois, followed by Helen Maude Ellis on September 6, 1872, and then Charlotte Courtland Ellis on June 27, 1874 in Joliet Illinois. By 1877, George's tuberculosis again became a problem, and the family decided to seek a new life in the west. So George and a pregnant Julia packed up the three young children and Grandma Ellis and headed to Kansas. The first Ellis ranch was along Owl Creek in Comanche County, a few miles north of the Oklahoma border. Years later Maude remembered the first house: "The grass grew very thick and by cutting sod with axe and spade, bricks were made to build a house. It was very warm, but there was no way to make a good roof. When the rains came, the floors were mud. Brother and I could walk on planks but Sister had to sit on a bed." A new son, Augustus Weisert (Augie), was born shortly thereafter, followed by another son, Francis Shipman (Frank), in 1879. The family had begun quite a new life in an unfamiliar environment with hope and energy. Charlotte described the scene: "Owl Creek ran just below the house. There was a grove of cottonwoods and other trees nearby. A path went up the hill at the back. Our cyclone cellar was there somewhere, I used to go down there to play. I was five."

For the once urban family the times fell somewhere between bucolic and primitive. They struggled along, raising cattle on the windswept prairie far from civilization. Julia was a bastion of stability and refinement. Charlotte depicts her: "I suppose none of us will ever forget how our mother comported herself day by day in the wilds. She was always the perfect lady under all circumstances. It was as natural for her to be so as it was to breathe. No one ever saw her careless in either dress or posture." For Julia, and Eliza Ellis as well, values and education were very important, and despite the remoteness of location and difficult circumstances, every effort was made to "home school" the children. Charlotte recalled:

Yes, she taught us – we three older children that is – but it was not only the three R's.... We read most of Dickens together, she taught us to like Shakespeare, the Waverly novels, travels (how I enjoyed "Into Morocco"). She read poetry to us, Byron, Whittier, Jean Ingelow. (I always wanted her to read "Two Brothers and a Sermon" if I had to lie around with a cold.) I remember one Christmas especially, she read Dickens Christmas Carol to us and we enjoyed it more than I can tell.

Learning was not always in traditional settings. Charlotte continues:

One day the horses pulled down and spilled a hundred-pound sack of corn. We children had to pick that corn up kernel by kernel, for there was so much gravel mixed with it. How well I remember our pretty girlish mother, sitting on a log under a tree, reading to us as we worked. What was it she read? Homer's "Iliad". She had a wonderful reading voice and we children thrilled over Hector's burning of the wooden horse and all.

By 1882, the grass on the ranch had grown thin. Guy always felt that George had overgrazed the land. The family moved to a new location on Owl Creek. The situation lasted about two years. In September of 1884, George sold out and the family moved back to Chicago and stayed with Julia's parents.

George was determined to make a life in the frontier west. During the fall of 1884 he continued to explore for the perfect location. In his reminiscence of Charlotte entitled *Tiny Tools*, Charlotte's younger brother Paul (1891-1980) stated: "I often heard Father say that he was

on his way to Old Mexico to look for a coffee plantation, when he saw this mountain of quartz. He had always heard that there was always water where there was a large body of quartz." The mountain in what is now eastern Torrance County New Mexico, was called Pedernal Peak, and was located about halfway between the thriving town of Las Vegas, NM and the booming mining community of White Oaks in Lincoln County, NM. George decided it was the perfect place to establish another ranch. He sent for the rest of the family. Julia, Guy, Maude, Charlotte, Augie, Frank, and Grandma Ellis arrived in Las Vegas by train in late February 1885.

Charlotte remembered the area: "I'm not sure Pedernal would be called a mountain, but it has all the things mountains have except trees. For some reason or other it is a barren peak. But it has cliffs and canyons (miniature 'tis true), and wild flowers, birds and lizards, with clouds around the summit at times and springs in wet weather. We used to call the clouds around the top 'Pedernal's nightcap'." Her brother Guy observed: "There were no schools or churches. A doctor eighty miles away was as good as no doctor at all. Our nearest neighbors were twenty miles away and they were cattle and sheep ranches. There was only one of them where there were any women. Mother was cut off from any such things as morning calls or afternoon teas. We children didn't miss anything like that. We did not live so well here. Not so much of a variety on the table. There was not so much to do, more of a humdrum life. Yet we felt the lure of the country and were not unhappy."

During the summer of 1885, George built an eight-room house for the family out of rough lumber hauled from a mill eighty miles to the west. The house was comfortable during temperate seasons, but was miserable in winter. George and Guy spent the fall chiseling a 35 foot deep well through rock, hitting water just before winter. Winter snows filled the well to overflowing. The flow continued into the following summer. Even after the well stopped flowing, it held water until the summer of 1887, when it dried up completely. From the spring of 1886 to the fall of 1887 the family eked out a life on the high plains of central New Mexico. Sheep and cattle herders frequently passed through the area. The Ellis family was able to make much needed money by providing food and lodging. George traveled to Las Vegas every other month or so to get mail, goods, and supplies. The family even operated a country store. Guy remembered: "We also had a stock of goods for the sheepherders, which brought in a little cash and a lot of sheep pelts. The poor herder was glad to find a place where he could buy such luxuries as flour, lard, baking powder and matches. Also overalls, shirt or a pair of socks." Other visitors used the Pedernal home as a way station. At least one was rather famous. On April 10, 1954, Charlotte wrote a letter² to William MacLeod Raine, author of *Famous Sheriffs and Western Outlaws*, to thank him for agreeing to autograph a copy of his book for her young nephew. In the letter she wrote: "We (Ellis) knew Pat Garrett³ very well. He would stay all night with us on his way from White Oaks to Las Vegas, or wherever he was bound from or to. To little me he seemed very refined. He dressed better than most of the men of the plains and was very soft-spoken and well-spoken." In the same letter Charlotte mentions another traveler in the area:

When I was a small girl we (the Ellis family) lived at Pedernal Peak for four years. The Carruthers at the time had a butcher shop in San Pedro, New Mexico (and some mines, of course) and Jim used to take the long trip to Monteceno (?) to buy beef cattle of Jose (?) Pera. Pera owned the Turkey Track brand. The brand spread from the animal's shoulder to its flank.

Jim knew many of the people we knew – the Pereas and some of their relatives, the Spence brothers at Penos Well, people at Antelope Springs, Estancia, Stinking Springs and so on – and yet since Jim took the route that passed on the other side of Pedernal, we did not meet until several years later . . .

In the fall of 1887, the well went dry. Money ran short. George

went to Nebraska to work for a time. Julia, grandma Ellis and the five children had to make do. Guy and his two younger brothers had to haul water from miles away, water that had to be strained and boiled before use. The situation looked grim for the Pedernal venture with winter coming on, but fate was to take a hand. In his trips to Las Vegas George had made the acquaintance of a man named Ferris who lived midway between Pedernal and Las Vegas. Ferris was a fellow tuberculosis sufferer who had been a banker in Tennessee before moving west for his health. The two had become friends. Early in 1888, Ferris bought 300 horses and invited George to be his partner in managing and caring for the herd.

George built a large one-room house on the Ferris ranch, secured the house at Pedernal and the family started a new chapter. During the summer, Ferris invited both Maude and Charlotte to select a horse to make their own. Maude named her horse Nig and Charlotte, Lancer. Guy trained Nig for Maude, but fourteen-year-old Charlotte insisted on training Lancer herself. Lancer was strong-willed and difficult, but after much time and effort Charlotte calmed him. In her words: "Well I rode him and tamed him and trained him. He would carry double or treble, or as many as could crowd on him. I taught him to stand on his hind feet and to lie down, jump a rope and nod his head for oats." He was to be her dearest friend for the next sixteen years.

In the fall, Ferris sold the herd and the partnership ended. The Ellis clan returned to Pedernal. Sometime that autumn, George made contact with a man in Chicago who was planning to purchase land on the Pecos River, stock it, and create a working ranch. George was offered the job of foreman with the stipulation that he would teach the man's son about ranching. In the depth of winter early in 1889 the family made ready to move. With George and Guy driving a large wagon, Frank and Augie on top of the load, Julia and Eliza in a buggy, and Maude and Charlotte on Nig and Lancer, the frontier pioneers made their way to their new home which they would call Valley Ranch.

Valley Ranch contained roughly 600 acres, the majority forested. It bordered the Pecos River. There was a ten-room adobe house and a large barn, large enough to house 30 cows and 6 horses. An orchard grew behind the house. Fourteen acres of alfalfa were well established. The sound of the river was a constant background. The scenery was breathtaking. With the coming of spring, there was much work to be done – animals to be cared for, fences to repair, and a garden to be planted. These were happy times for the itinerant family.

Charlotte reveled in the new environment. Paul indicates: "Charlotte was fifteen now with a passion to learn about everything around her. The trees, the shrubs, grasses, plants and flowers, the birds and chipmunks all became her friends. She not only read everything she could get her hands on, but memorized a lot of it." Charlotte describes herself: "At Valley Ranch when Mother was too busy to teach us I used to take my books and go over to that 'island' above the dam and study all afternoon." Charlotte spent countless hours on her horse, hours that inextricably linked the two. Charlotte stated: "At Valley Ranch I used to enjoy riding along the steep bank above the dam. One slip and we would have plunged into the deep water below. I doted on swimming the river with Lancer. I taught him to walk the foot log over the irrigation ditch." Astonishingly, as was the custom of the time for women, Charlotte almost always rode sidesaddle.

Life for the Ellises was always a curious mixture of joy and sadness. During the time at Valley Ranch Charlotte fell from the hayloft in the barn, producing an injury to her back that would bother her for the rest of her life. The youth who was to be trained by George was unfriendly and refused to go the Valley Ranch, choosing, perhaps to spite his father, to go to work as a cowhand for another rancher. As a result, by 1890 the salary being paid to George was discontinued. George was dismayed. He and Guy, almost twenty years old, began to have friction. After the summer, Guy left Valley Ranch and moved to the Albuquerque area, getting a job in the small town of Golden near the San Pedro Mountains, about 50 miles southeast of Valley Ranch. Soon thereafter the Ellises were told to vacate Valley Ranch. Guy came back and helped the family move to Albuquerque, to begin again, far from the montane majesty of the upper Pecos river Valley, the best place they had

ever seen.

George found a job as a part-time carpenter in the Santa Fe Railroad shops. Grandma Eliza apparently returned to Chicago for a time. Frank and Augie were enrolled in school for the first time. One June 15, 1891 Julia, at age 42, gave birth to her last child, Paul Munson. The pregnancy had taken its toll on Julia, but she, with the help of Maude and Charlotte, operated a boarding house. Charlotte wrote to Guy many years later: "Neither of us went to school or anywhere as long as we had boarders; and two girls never worked harder than we did, for Mother was never very well after Paul came and we did all we could to help. Don't you remember how you and Mr. Wells used to come in and help me out? I do with grateful (sic) thanks. You, or Augie, or Frank nearly always helped me if I was going somewhere." Even in the busy life at the boarding house, Charlotte tried to pursue her passion for learning. She continued to Guy: "I was always ambitious; not only for myself, but for all of us; I always wanted to learn, always liked to study... Always had a textbook of some kind on hand at the boarding house."

In February 1889, the New Mexico Territorial Legislature passed House Bill No. 186 establishing the University of New Mexico at Albuquerque (as well as the Agricultural College and Experiment Station at Las Cruces, the School of Mines at Socorro, and the Insane Asylum at Las Vegas). By 1891, the first president of the University had been selected and construction began on the school's first building. Charlotte desperately wanted to attend, but did not think it would be possible. She elaborates in her letter to Guy:

One day (I will never forget that day) I went over to see Nelly Stagg. She wasn't home, and while I sat waiting for her I gradually unburdened my heart to Mrs. Stagg, and we had a long heart to heart talk, though I might say shoulder to shoulder talk, for we both talked "right from the shoulder". Mrs. Stagg said I was to go to the university when Nelly did; and Nelly took me to see Professor Ramsey, the president⁴, that very afternoon. He was splendid and gave me every encouragement, and in his mind as far as he knew it was all settled that I was to enter school. Still there were other obstacles [sic] to surmount – fees, books, clothes and means of getting to the university.

The obstacles were not so large as they seemed. As luck would have it the woman who cleaned house for Mrs. Munson once a week left town at that time and Mrs. Munson gave me the job. I cleaned house for her Saturday mornings all the rest of the time I was in Albuquerque, and I did the same for her neighbor Saturday afternoons. Hard work but they had lovely houses and beautiful things to take care of and I enjoyed it in a way. Then I had the job of taking care of the little girl next door some times. You remember them – their name was Moor(e). I planned to walk to school; two miles didn't seem far, but Margaret Jenks was tired of riding horse back to school after the first few weeks so suggested we go up in my cart, using her horse. This worked out just fine, and we only went horseback on rare occasions.

When I got all my strings ready to pull I went in great excitement to tell you and Mother. She thought I couldn't stand the work and confinement, for I had always been a "puny" child and girl, but I told her what I had done and how professor Ramsey said he would make it as easy as possible for me. She went up to see him herself for she always had our education at heart. She gave her consent and entered right into the spirit of it; trimmed the prettiest (sic) hat for me and got out the piece bag and made me one of the prettiest dresses I ever had. I hated to tell you boys of my plans for it somehow didn't seem right for me to be going to school when you

were working and supporting us, but I salved my conscience by thinking what I could do for every one when I had been trained for something. It was hard to convince you of the desirability of my going to school but I do not think that side ever entered your generous old head. You were sure I couldn't stand the confinement, and Mother needed me at home.

But finally you were reconciled to the idea of my trying; and so I went for eight and a half happy months. It was a happiness a young person who has been to school all their life could not understand.

Yes, it was hard in some ways at first, not only (nor so much) on account of the confinement as from the morbid, agonizing shyness, with which I have always been afflicted, and the feeling of being "rural" and "green". But how the teachers did "back me up" – Professor Ramsey, Miss Taylor⁵, Miss Morrow⁶ especially, -- talk about helping lame dogs over stiles!

Thus, in the summer of 1892, Charlotte became a student at the University of New Mexico during the first year it opened its doors. The summer session began June 15. On June 20, 1892 Charlotte made her first formal plant collection, of the comb-leaf evening primrose (*Oenothera coronopifolia*), an unnumbered specimen now at the New York Botanical Garden. The collection was made of the Plains of San Agustin in Socorro County, New Mexico. This, almost certainly, must have been part of a university-sponsored activity. Charlotte was one of 75 students who entered UNM that first summer. Most, including Charlotte, were placed in the Preparatory Department, whose function was to assure that students had achieved the educational level of a high school graduate, since New Mexico had no high schools at the time. Guy and Maude also became students in the fall of 1892. In its early years, the University published the names of prospective students for the following year in the course catalog published each spring. Charlotte and Maude were listed as freshmen in the Normal Department and Guy in Special Studies for the 1893-94 school year (see Appendix 1). Entering the University in 1892 was undoubtedly one of the happiest moments in Charlotte's life.

Meanwhile, George's tuberculosis reappeared. He was unable to continue as a carpenter. He became associated with an entrepreneur by the name of Herman Blueher. George and Herman established a lifelong friendship. Years later the Ellises and the Bluehers often visited one another. Blueher was growing fruit and vegetables for the increasing Albuquerque population and was interested in expanding sales to the developing mining communities of Golden and San Pedro about 30 miles to the east. George began making trips with a loaded wagon drawn by Nig and Lancer. A great opportunity arose for Maude when a family friend in Las Vegas, Mrs. McGee, suggested that Maude should come to live with her and enroll in the newly established Normal School. With the financial help of friends and Julia's parents, Maude was able to complete her education in Las Vegas over the next three years. However, George's health problems grew worse and his doctor advised him to get out of the Rio Grande Valley. He began looking around in the mountains east of Albuquerque for a suitable place to relocate. On his travels to and from Golden, he noticed an abandoned water pipeline coming down from the Sandia Mountains. In the early spring of 1893 he traced the pipeline to moist, wooded Las Huertas Canyon. He had found what would become the new Ellis ranch.

By May of 1893, he was ready to move the family to the mountains. He pulled Frank and Augie out of school and began moving the family's belongings out of the Rio Grande Valley. Charlotte's world was about to fall apart. George was going to take her out of the University two weeks before the end of the semester. She described the situation in her letter to Guy:

It was Father who took me out of school. He came down in May and I tried to coax him into letting me stay, at least until the end of the term. You talked to him to (sic),

and I thank you. Miss Keepers⁷ invited me to stay with her. Mrs. Munson, and Mrs. Ives said they would do all they could for me. Don't you remember how I sold that bicycle you gave me (when you bought that other one) and bought my Delsarte⁸ costume? Don't you remember giving me suggestions for my essay on killing birds? I was to read it at Commencement. And how Professor Ramsey insisted I should bring Father up to see him so he could talk to him in my behalf. And Father told him what he thought of him for interfering in his affairs? So humiliating.

Charlotte found herself living in a double-walled tent in Las Huertas Canyon, sad and bitter, her dream stolen.

The first year or two were busy at the new ranch, which soon became known as Ellis Ranch. George, with the help of Frank and Augie built a large log house, a house that withstood the pressures of time and weather until it was razed by an arsonist in 1991. A garden was established, fences built. Charlotte endured. Paul imagines the situation: "She would avoid meeting or speaking to Father whenever possible. Perhaps Mother, too, for 'siding in' with Father. She would have seen little of Augie and Frank away from Father." Her closest associates were the family dog Sport and, of course, her beloved Lancer. Paul continues:

Charlotte took short explorations at first, looking for butterflies and flowers. To relieve her pent-up energies, she would have climbed higher and higher to see just how high her "fences", the surrounding mountains, were. In that dark mood she might have been thinking of running away from home. She had had a taste of association with other people and school work, and it was sweet to her very ambitious nature.

Charlotte describes her solitary time with Lancer:

In the Sandias I have ridden my pony over places where one would think a goat could hardly get a foothold. Up places where he had to jump from step to step. Down steep hillsides where he had to put all four feet together, sit down, then slide. I rode him through bogs and snow drifts and down timber. I'll tell you, there was a horse.

Eventually, Charlotte began to soften. Despite her disappointment and misery, she came to recognize a certain inevitability. Then, one night, she had a dream. Paul relates:

Charlotte dreamed, that with her favorite teacher, Miss Taylor, she was exploring the face of Palomas Mountain. Miss Taylor was telling Charlotte about the butterflies, flowers, oak brush, acorns, pinyon pines and their delicious nuts. They reached and scaled the edge of the limestone rim that caps Palomas Mountain, and Charlotte began to lag. Miss Taylor was hurrying on up and east, calling to Charlotte to follow. But from a prominence, Charlotte, looking back, saw the house in the distance far below. Mother was sitting in front of it, weeping. Awakening from her dream, Charlotte clipped her own, restless, ambitious wings and resigned herself to stay with Mother.

She began to accept her role in maintaining the family's well being. Gradually she began to rediscover the simple pleasures and gentle beauties of living in a mountain forest. She collected butterflies and became enthralled with the flowers. She began to assign her own special names to her favorite haunts, like Chokecherry Lane, Midnight Flat, and Balcomb's Camp. She referred to the Ellis Ranch as Balsam Park.

George, Augie, and Frank continued to push back the wilderness, cutting trails, clearing trees, pulling stumps. Eventually, seven fields averaging an acre each were prepared. Charlotte, Julia, and

Grandmother Eliza, who had returned from Chicago, took care of the cooking, washing, and other domestic chores including taking care of young Paul. Meanwhile Maude completed her education at Las Vegas in the Spring of 1895 and began teaching kindergarten in Albuquerque. After a few months, measles broke out and the school was closed. Guy delivered her to the Ellis Ranch. During the mid-1890's George and Frank began to have problems and in 1896, Frank ran away at age seventeen. He would occasionally visit the ranch, but the family was one smaller. In 1897 Guy married Marian Hubbs. Late in the decade Charlotte became Paul's teacher. George built a school desk and Charlotte held class. Around the house Charlotte had the nickname "Charlie", but in her schoolhouse, Paul was required to address her as "Miss Ellis." For several years, the son of a family friend, R.G. Balcomb, spent the summers with Paul at the Ellis ranch and joined the "school." Kenneth Balcomb remembers:

As Paul had no chance to attend regular school, Charlie (Charlotte) taught him school subjects in pace with the curriculum of public schools. It was much easier for her to keep his interest when I, or some other visiting boy, was there, so we had school every weekday morning – grammar, reading, writing, spelling and geography; and such was her artistry as a teacher that we enjoyed it.

By the late 1890's the Ellis ranch was well established. There was a field of wheat and a large garden. Cattle roamed the ranch and surrounding woods. Chickens provided fresh eggs. George felt that Charlotte and Maude would be permanent residents. Paul recalls: "Father planned for both Maude and Charlotte to file on a homestead there. Charlotte's house was even started. The posts were set and floor plates laid." After the turn of the century things began to change. George's mother died on November 12, 1901 and was buried on the ranch. Maude became friends with a man named Horace Richard Yeomans. The couple got married at the ranch on April 30, 1902 and left soon thereafter. George never really accepted the marriage and never forgave Maude. Maude and Dick moved to Arizona. Lancer died in 1904. Friends of George informed him the United States Government was preparing to set up a Forest Reserve (National Forest) System which would likely absorb the property he had worked so hard to carve out of the woods. George traveled to Santa Fe to make sure his homestead would be preserved. On July 13, 1905, he received Homestead Certificate #3519, personally signed by Theodore Roosevelt, and the ranch became truly the Ellis Ranch, which the family abbreviated as the LS Ranch for the brand on their cattle.

During this period Charlotte began to not merely accept her situation, but to enjoy it. She liked teaching Paul. Gardening was rewarding and she enjoyed quilting and sewing. Charlotte had always loved animals. She tended to the animals at the ranch. She attached names to all of them, even the chickens. She came to enjoy interacting with neighbors and the not infrequent visitors to the ranch. Over the years she began traveling to nearby homes, sometimes tracking down lost cattle, sometimes to just say hello. She even traveled all the way to the town of San Pedro where she was a welcome visitor or even an overnight guest at the home of Jim Carruthers and his family with whom the Ellises had developed a strong friendship. In her diary she tells of coming home to Balsam Park from a trip with Augie on December 26, 1908 down the east side of the Sandia Mountains:

It was late afternoon when we climbed the slope for home, and the mountains to the east of us were sights to behold, the Santa Fe and Pecos Mountains looked like filmy pale lavender chiffon that had been thrown carelessly on the plains. The Cerrillos Mountains were rose, the Ortiz were a dark blue, and the San Pedro and South Mountain, shades of purple, seamed with black shadow, and casting shadows across the plains. Imagine all this sitting on the brightest, goldenest of the plains with the bluest of blue skies for a background.

The allure of the wildflowers became her passion. Paul summarizes: "Charlotte had a nice collection of butterflies, but as my memory of her awakened, she had turned her hobby to botany and collecting flowers." She became dedicated to the study of the plants of her area. In the late 1890's she made contact with T.D.A. Cockerell and E.O. Wootton at the NMCA & MA (now New Mexico State University) in Las Cruces. They encouraged her to send specimens and helped her with identifications. Her first major discovery was the *Primula ellisiae* in 1900, which just whetted her appetite. A few years later, she came upon her second exciting find, the white shooting star. She spent many hours trekking through the meadows and woods for miles both on foot and on horseback, hunting her plants. Through her mentors she learned how to press and dry her finds, and to collect all parts of the plants. She also became interested in rocks and minerals. On the second floor of the house, Charlotte set up space for dealing with both her botanical and geological pursuits. By 1910, Augie was employed away from the ranch and had become only an occasional visitor. Guy and Marian had become established in the San Francisco Bay area in California. Dick and Maude were settled in the White Mountains of Arizona. The Ellis Ranch was quiet, with only George, Julia, Charlotte, Paul and occasional visitors. With the family dispersing, George made out his will, leaving the ranch to Charlotte, the eldest remaining child. Early in 1912, the never healthy George grew ill. He died on March 31. Herman Blueher came up to the ranch and buried George next to his mother. Julia, Charlotte, and Paul made arrangements with the Bluehers and other friends and neighbors for the disposition of livestock and the care of the homestead. Paul states: "Nearly twenty-one years after Mother named me Paul, Guy came to Balsam Park to take Mother to Berkeley with him, as Father had passed on a few months before." Charlotte was committed to caring for Julia. Charlotte and Julia gathered essential belongings and headed to Bernalillo with Guy to catch a train to California. Paul followed later. By late 1913 Julia also fell ill and died on January 22, 1914. At this point details about Charlotte's life become difficult to track. Few records remain, but a general picture can be assembled.

Charlotte was back at the ranch by the spring of 1914. It is clear that she had remained in communication with the botanical contacts she had made at NMCA & MA in Las Cruces. As noted above Cockerell had departed Las Cruces in 1900 and New Mexico in 1903. In 1906 Paul Carpenter Standley, later assistant curator of the U.S. National Herbarium, transferred from Drury College in Missouri to NMCA & MA for his senior year, graduating with the class of 1907. He and Wootton developed an excellent rapport. Standley continued, receiving as M.S. in Biology in 1908 and joining the faculty before departing for the Smithsonian Institution in 1909. He and Wootton began to plan writing the first Flora of New Mexico. Standley became familiar with Charlotte's efforts during this period. She is specifically mentioned as one of 46 collectors in his *The Type Localities of Plants First Described from New Mexico* in Contributions from the U.S. National Herbarium 13: 143-246, published in 1910. In 1911 Wootton also left Las Cruces to work at the U.S. Department of Agriculture in Washington, D.C. Charlotte made extensive collections in the Sandias during the summer of 1914 from her home base back at the Ellis Ranch. It seems almost certain that Wootton and Standley stimulated her activity. She gathered hundreds of specimens that were placed at the U.S. National Herbarium, the Missouri Botanical Garden (MO), and the New York Botanical Garden (NY). When Wootton and Standley published their Flora of New Mexico in the summer of 1915, Charlotte's specimens were cited seven times⁹. She was credited with the type localities¹⁰ of *Primula ellisiae*, *Dodecatheon ellisiae*, and *Achillea laxiflora* (later synonymized to *A. millefolium*). Charlotte also continued correspondence with Cockerell in Colorado during this time in regard to her favorite little Primula. She maintained her contact with Cockerell well into the 1930's.

In July of 1915, from the vicinity of Springerville, Arizona, Charlotte again contacted Cockerell in Boulder¹¹. She was visiting Dick, Maude and their seven children at their "Rancho" along the Little Colorado River. It was as if she were finally free, at last the keeper of

her own destiny. She could travel around Arizona and to Balsam Park. She could have whims. She loved being back at the ranch in temperate seasons. Paul averred that no one spent winter at the ranch after 1912. Charlotte's presence on South Edith Street in Albuquerque in September of 1914¹¹ seems to verify this. Charlotte reappeared at Dick and Maude's White Mountains Rancho again in October 1916 when she stayed with Maude until the birth of Maude's new daughter Francis on October 23.

In the spring of 1917 Charlotte and Paul returned to the Ranch. They were considering putting the place up for sale and wanted to put things in order. They reestablished contact with old friends and neighbors, the Luceros, the Trujillos, the Carruthers, and in particular Dr. Hugh A. Cooper. Cooper is described by Sherry Thompson in her 1991 study of the Ellis Ranch:

One of the many people who traveled in the canyon and met the Ellises was Dr. Hugh A. Cooper. Reverend Cooper was a Presbyterian minister who had come to the southwest for his health. He, like Mr. Ellis, suffered from tuberculosis. According to his grandson Robert Cooper, Dr. Cooper left his family and congregation in Centerville, Iowa to find a cure, or at least relief, in the arid Arizona desert. He made it as far as Albuquerque, where he got off the train feeling too ill to go on. But after only two weeks in Albuquerque he was feeling much better. In six months he was fully recovered. This was in 1903. He called for his family and started a ministry in his new home. He was always an outdoors type and frequently took walks in the mountains. It is possible that he met the Ellises on one of these sojourns. They became friends.

Since Charlotte and Paul had little money, they bought groceries and supplies on credit from Bernalillo Mercantile Company. They wanted to get the Ranch up and running again. In April of 1917 the United States had entered World War I. Both Paul and Reverend Cooper's son were threatened by the prospect of military service. Dr. Cooper brought his son to the Ranch to enter into partnership with Charlotte and Paul to raise potatoes. After a few months it became obvious that the potato project was a failure. Paul and Dr. Cooper's son determined that the military was inevitable and decided to enlist. Bernalillo Mercantile was demanding payment. Things looked bleak for the Ranch. Dr. Cooper stepped in and paid the debt. Paul states: 'It would have been very much harder for Charlotte when I had to go to France in August, without the friendship and help of the Coopers.' The Ranch was saved and somewhat rejuvenated.

Over the next few years Charlotte was in and out of the Ranch. She spent considerable time in Arizona. She remained close to Maude and her family. Frank was also living in Arizona. Charlotte actually held a job for a while, working at the Flinn Sanatorium in Prescott. By that time Maude, Dick and children had moved to Prescott. Charlotte was able to help Maude with the care of her son, Art, when he caught scarlet fever and had to be separated from the other children. Charlotte was also able to provide care and critical assistance when her only sister developed double pneumonia. Maude felt that she surely would not have survived without Charlotte. During her time living in Prescott Charlotte met and became good friends with a woman named Sharlot Hall. Sharlot, born in 1870, led an early life strangely similar to Charlotte's starting out in a ranch in Kansas and moving in 1882 to a ranch in Arizona. Sharlot was the first woman to hold office in the Arizona Territory, appointed as Territorial Historian in 1909. Sharlot was also chosen to deliver Arizona's three electoral votes to Washington D.C. after the election of Calvin Coolidge in 1924. There is a Sharlot Hall Museum in Prescott to this day.

As the Roaring Twenties matured, Charlotte became more anxious to sell the Ranch. Paul had returned from his service in France and was employed by the Forest Service in Oregon. According to Paul's notes, a family friend, Roy Stamm offered Charlotte \$3000 for the ranch. He

wanted to make it into a beer garden. Charlotte categorically refused. Apparently another man made a similar offer, but it didn't feel right to Charlotte. Finally Dr. Cooper, along with his son and another man, E.D. Sisk made an offer. It must have been an epiphany for Charlotte. Dr. Cooper put up \$5000 for half interest, his son and Sisk \$2500 each for quarter interest. In October of 1924 the deal was finalized and the Ellis Ranch became the Cooper LS Ranch. Ten thousand dollars was quite a tidy sum at the time. Charlotte had her first taste of financial independence age 50.

Even though Charlotte had officially sold the Ranch, her close friendship with the Coopers allowed her to continue to spend time there. This turned out to be a stroke of fortune for the dear friend of the Ellises, Jim Carruthers. His wife died and he was in his late seventies. Charlotte had spent her life caring for others and she continued with Jim. Certainly she continued to visit Arizona. Maude's husband died in 1927, but she stayed in Prescott for a while in order for her youngest children to finish high school. Charlotte most likely offered help. By this time Maude's daughter Helen and son Richard were living and working in Denver. Maude was planning to head to Colorado after leaving Prescott. Maude's daughters Edith and Betty had moved to Colorado. Charlotte determined that she had to say her final goodbye to the LS Ranch. Her last known correspondence from the Ranch is a letter to her Uncle George on June 26, 1929¹². By early 1930, she was living in Denver. Jim Carruthers was soon to follow.

On February 21, 1930 Charlotte wrote a letter to NMCA & MA from her address in Denver regarding control of locoweed. Although her letter is missing, she apparently signed it C.C. Ellis. The return letter¹³ uses the greeting "Dear Sir", assuming that C.C. Ellis must be a man. Her choice of the signature must have been a reflection of her view of the status of women at the time. By 1936 she had a different address in Denver when she again contacted Cockerell in Boulder¹⁴. She was apparently working with children in Denver, ever the teacher, always helping others. By this time old Jim Carruthers was ninety years old, with his vision failing. Charlotte continued to care for him, even reading to him.¹⁵ He died in 1939, leaving his effects and money to Charlotte.¹⁶

After Jim's death Charlotte did some traveling. She kept a spiral notebook containing a variety of anecdotes about her bird Tiddleywinks, her sister Maude and Jim Carruthers, along with some of her poems and vignettes of her trips in the early 1940's.¹⁷ One, dated August 12, 1940, is entitled "Here I Am At the New York World's Fair". Also included are notes about her attending a Christian Youth Movement Conference in Estes Park, Colorado in June 1941. Another adventure to Miami, Florida and Cuba is described in August 1941. After she returned to Denver she restricted her travels to the state of Colorado. Her nieces Edith and Betty had married and moved to Colorado. Family tales remain of Charlotte over the age of 60 traveling to visit nephew Richard and spending countless hours in a pastime she had first mastered at the Ferris Ranch in 1888, breaking horses. Back in Denver she became very active in the Shut-In Society, regularly paying visits to people who could only rarely leave their homes. She was an active member of the Mineral Society of Denver. By the early 1950's niece Betty Keller in Denver had added two young great-nephews to Charlotte's list of charges.

By early 1956 Charlotte was feeling very old. Her memory wasn't what it used to be. She suffered a great deal with arthritis. She had miserable bouts with shingles. Her youthful back injury made it increasingly difficult to get around. In March Charlotte had a stroke. Maude describes the situation in a letter to Paul:

There are many things I don't know about concerning her stroke but E. [Betty, Maude's daughter] did write that she never cried so much in her life and that tells me a great deal. E. could not take care of her with two lively boys and a husband and no room. She wrote Mother "I don't have anything but love and that is not enough" I wrote Alta Blake and she took her to her home, she was there when she died, she was in a coma for two or three days. Alta said she laughed in the coma. Elizabeth went to see her but she did not know her which broke her heart, they had always been so close.

On March 17, 1956 Charlotte was gone, three months from her eighty-second birthday.

Charlotte's deepest self was born on the frontier, from her earliest awarenesses on the mixed grass prairie of the Great Plains, through the nascency of her intellectuality on the dry high plains beside Pedernal Mountain, to the first glimmering of her identity in the towering forest along the Pecos River and the delicious taste of its growth at the University, finally through agonizing disappointment and sorrow, to reach a comfort and a quiet inner joy that allowed her to give herself to the care of others and to the study of the natural world around her. Despite her lack of formal education, she never ceased to adore the process of learning. Her calm persistence and constant delight in the pursuit of plants would seem products of her history. Her lifelong concern for and dedication to those around her is a gentle reminder for us all. Her contacts with the most significant figures in New Mexico botany in her time will ensure that she will always be some portion of the future, forever part of the State's history. The little *Primula* that so moved T.D.A. Cockerell stands tall to this day. Her white shooting star is part of research on the genus *Dodecatheon* at the Missouri Botanical Garden as this article is written, a simple unintended tribute to the character of this irrepressible woman.

Charlotte's Plants

There are great difficulties in locating specimens of collectors like Charlotte Ellis, who was not specifically tied to any institution and who lacked specialized equipment and training. Of course, the passage of almost a hundred years, as well as changes in collection standards, labeling procedures, and plant nomenclature impact as well. Charlotte did not have a consistent numbering system, in fact, numerous collections were without numbers, or numbers were assigned by recipients. For example, in the course of this study eight specimens listed as #3, and three specimens listed as #4, and five specimens listed as #5 were located. Charlotte apparently did not maintain field notes, or at least, none are extant. Site data and dates of collection are sketchy at best. Charlotte sent her material to Cockerell, Wooton, Standley, and possibly others, who would identify the specimen or pass it on to others for analysis, further complicating location.

The vast majority of her collections were not holotypes like *Primula ellisiae* or *Dodecatheon ellisiae*, or even isotypes (collections believed to be duplicates of holotypes). Rather they were predominantly relatively common plants. As such they would have been submerged in the general collection at the herbarium that received them. In this case specimens can become, for all practical purposes, inaccessible. Charlotte's specimens are housed in at least five herbaria, the New York Botanical Garden (NY), the Smithsonian Institution (US), the Missouri Botanical Garden (MO), the University of New Mexico (UNM), and New Mexico State University (NMC). In preparation for this article, all of Charlotte's specimens at UNM (2) and NMC (75), were examined. The collections at UNM and NMC are completely databased. However, the situation at NY, US, and MO is far more complicated. In the case of NY, the general collection contains over 7 million specimens, of which roughly 700,000 are databased and searchable by computer. These represent the more important collections, types and unusual specimens. Collections of common species are mixed in with hundreds or thousands of others and accessible only by personal observation. At US with 5 million specimens, 800,000 databased, and at MO with 5.2 million, 900,000 databased, the situation is similar. Even with knowledge of the genus and species of a collection, locating it in a major herbarium can be quite laborious.

With all of this in mind, it would seem that a general picture of Charlotte's collections could never be realized. However, in December of 2006, a copy of a list of Charlotte's collections was discovered buried in an obscure folder in a file cabinet at the UNM herbarium. The typed list contains scientific names with cited authorities and is numbered from 2 to 476, but with numerous gaps. It is annotated in Charlotte's own hand, although some entries are too faint to read. She not only filled in many gaps, but also provided her views of common names and

the month and day of collection of most specimens, but without a year. It appears quite likely that the list is a compilation of most of the collections she submitted to E.O. Wooton and P.C. Standley, the vast majority from 1914. The nomenclature of the list closely parallels that found in Wooton and Standley's 1915 *Flora of New Mexico*. Since Charlotte did not have a formal education in botany, nor a significant library of technical resources, nor contact with many major botanical authorities, it is extremely probable that Wooton and Standley provided the list to Charlotte.

This list is combined in the following database with information available from NY, US, and MO to provide a general overview of Charlotte's work. Even though a large number of specimens cannot be localized to a specific herbarium, the database certainly provides an effective summary of the taxa she gathered and a snapshot of the flora of the Sandia Mountains during her time there. In no database reviewed have any specimens been located which were collected after 1914. Indeed her life after 1914 almost precludes periods of significant collection. There have been reports of Charlotte collecting in the White Mountains of Arizona in 1915. No record of such has been found in this study. Reported collections around Hot Springs, NM (now Truth or Consequences) housed at NMCA & MA are certainly incorrect. All specimens at NMC were determined and labeled by E.O. Wooton, and according to his labels were collected in 1908 and 1909 in the Sandia Mountains.

Charlotte's 515 collections encompass 80 families, 293 genera and at least 345 species, an amazing diversity for an amateur collector. In addition to typical flowering plants she gathered grasses, ferns, mosses, sedges, and lichens, difficult groups for a generalist. Such breadth of collection speaks to her sharp eye in noting differences in plants and her indefatigable pursuit of them. In addition to the above-mentioned *Primula* and *Dodecatheon*, she is credited with one other holotype, a milkvetch, *Astragalus praelongus* var. *ellisiae* as well as numerous isotypes.

Notes

- ¹ A holotype is the one collection which is permanently attached to a given scientific name
- ² See Appendix 3.
- ³ Pat Garrett is the sheriff generally credited with killing Billy the Kid on July 13, 1881, near Fort Sumner, NM.
- ⁴ George S. Ramsey, Principal of the Normal and Preparatory Departments. See Appendix 1.
- ⁵ Marsha L. Taylor. See Appendix 1.
- ⁶ Alcinda L. Morrow. See Appendix 1.
- ⁷ Lily Keepers, another student at the University of New Mexico. See Appendix 1.
- ⁸ François Delsarte, French musician and teacher (1811-1871), developed an acting method to facilitate emotional expression through gesture and vocal control. "Delsarte" courses were popular in the late 1800s, emphasizing poise, breathing control, posture, etc. for effective appearance on stage or at the podium.
- ⁹ *Fagopyrum fagopyrum*, *Silene noctiflora*, *Lychnis githago*, *Dodecatheon ellisiae*, *Achillea laxiflora*, *Anthemis cotula*, *Primula ellisiae*.
- ¹⁰ A type locality is the location where a new species is first collected.
- ¹¹ See Appendix 2.
- ¹² See Appendix 3.
- ¹³ See Black letter, Appendix 3.
- ¹⁴ See Appendix 2.
- ¹⁵ See Raine letter, Appendix 3.
- ¹⁶ Personal communication with Maude's granddaughter, Dixie Northcott.
- ¹⁷ See Appendix 4.

#	Family	Modern Name	Early Name	Year	Herbarium
sn	AMBLYSTEGIACEAE	<i>Amblystegium serpens</i> var. <i>juratzkanum</i> (Schimp.) Rau & Herv.		1914	NY
8.1	BRYACEAE	<i>Bryum argenteum</i> Hedw.		1914	NY
10.2	BRYACEAE	<i>Bryum capillare</i> Hedw.		1914	NY
sn	BRYACEAE	<i>Bryum uliginosum</i> (Brid.) Bruch & Schimp.		1914	NY
14	CRATONEURACEAE	<i>Cratoneuron filicinum</i> (Hedw.) Spruce		1914	NY
11	GRIMMIACEAE	<i>Jaffuelobryum wrightii</i> (Sull.) Ther.		1914	NY
sn	HYPNACEAE	<i>Brachythecium rivulare</i> Schimp.		1914	NY
10.1	HYPNACEAE	<i>Brachythecium salebrosum</i> (F. Weber & D. Mohr) Schimp.		1914	NY
sn	LESKEACEAE	<i>Lescuraea arizonae</i> (R.S. Williams) P.S. Wilson & D.H. Norris			NY
sn	MNIACEAE	<i>Plagiommium cuspidatum</i> (Hedw.) T.J. Kep		1914	NY
13.1	TIMMIACEAE	<i>Timmia megapolitana</i> Hedw.		1914	NY
1 bis	DRYOPTERIDACEAE	<i>Cystopteris fragilis</i> (Linnaeus) Bernhardt		1909	NMC
3 bis	DRYOPTERIDACEAE	<i>Woodsia neomexicana</i> Windham	<i>Woodsia mexicana</i> Fee	1909	NMC
3 fns	DRYOPTERIDACEAE	<i>Woodsia neomexicana</i> Windham			
5 bis	PTERIDACEAE	<i>Pellaea atropurpurea</i> (L.) Link		1909	NMC
6 bis	PTERIDACEAE	<i>Pellaea wrightiana</i> Hook		1909	NMC
3.3	-PARMELIACEAE	<i>Pseudevernia consocians</i> (Vain.) Hale & Culb.		1914	US
5.1	-PARMELIACEAE	<i>Pseudevernia consocians</i> (Vain.) Hale & Culb.		1914	US
3.4	-PARMELIACEAE	<i>Pseudevernia intensa</i> (Nyl.) Hale & Culb.		1914	US
1.1	-PARMELIACEAE	<i>Xanthoparmelia taraxica</i> (Kremplh.) Hale		1914	US
42	ACERACEAE	<i>Acer glabrum</i> Torrey var. <i>glabrum</i>	<i>Acer glabrum</i> Torr.		
44	ACERACEAE	<i>Acer negundo</i> Linnaeus var. <i>interius</i> (Britton) Sargent	<i>Acer negundo</i>		
46	AGAVACEAE	<i>Yucca baccata</i> Torrey var. <i>baccata</i>	<i>Yucca baccata</i>		
371	AGAVACEAE	<i>Yucca glauca</i> Nuttall	<i>Yucca glauca</i> Nutt.		
146	AMARANTHACEAE	<i>Amaranthus palmeri</i> S. Watson	<i>Amaranthus palmeri</i> S. Wats.		
146.1	AMARANTHACEAE	<i>Amaranthus powellii</i> S. Watson	<i>Amaranthus powellii</i> S. Wats.		
256	ANACARDIACEAE	<i>Rhus glabra</i> Linnaeus	<i>Rhus cismontana</i> Greene	1909	NMC
254	ANACARDIACEAE	<i>Rhus trilobata</i> Nuttall var. <i>trilobata</i>	<i>Schmalzia trilobata</i> (Nutt.) Greene		
474	ANACARDIACEAE	<i>Rhus trilobata</i> Nuttall var. <i>trilobata</i>	<i>Schmalzia trilobata</i> (Nutt.) Small		
245	ANACARDIACEAE	<i>Toxicodendron rydbergii</i> (Small ex Rydberg) Greene	<i>Toxicodendron rydbergii</i> (Small) Greene		
357	APIACEAE	<i>Berula erecta</i> (Hudson) Coville	<i>Berula erecta</i> (Huds.) Coville		
76	APIACEAE	<i>Conioselinum scopulorum</i> (Gray) Coulter & Rose	<i>Conioselinum scopulorum</i> (Gray) C. & R.		
263	APIACEAE	<i>Cymopterus acaulis</i> (Pursh) Rafinesque var. <i>fendleri</i> (Gray) Goodrich	<i>Cymopterus fendleri</i>		
227	APIACEAE	<i>Cymopterus bulbosus</i> A. Nelson	<i>Phellopterus utahensis</i> (Jones) Wootton & Standley		
7.1	APIACEAE	<i>Cymopterus constancei</i> R.L. Hartman	<i>Cymopterus Utahensis</i> Jones	1908	NMC
53	APIACEAE	<i>Osmorhiza depauperata</i> Philippi	<i>Washingtonia obtusa</i> C. & R.		
55	APIACEAE	<i>Pseudocymopterus montanus</i> (Gray) Coulter & Rose	<i>Pseudocymopterus montanus</i> (Gray) C. & R.	1909	NMC
246	APOCYNACEAE	<i>Apocynum medium</i> Greene var. <i>lividum</i> (Greene) Woodson	<i>Apocynum lividum</i> Greene		
467	ASCLEPIADACEAE	[<i>Asclepias subverticillata</i> (Gray) Vail]	<i>Asclepias galioides</i> HBK		
299	ASCLEPIADACEAE	<i>Asclepias asperula</i> (Decaisne) Woodson subsp. <i>capricornu</i> Woodson	<i>Asclepiodora decumbens</i> (Nutt.) Gray		
472	ASCLEPIADACEAE	<i>Asclepias latifolia</i> (Torrey) Rafinesque	<i>Asclepias latifolia</i> (Torr.) Raf.		
465	ASCLEPIADACEAE	<i>Asclepias macrotis</i> Torrey	<i>Asclepias macrotis</i> Torr.	1914	MO
358	ASCLEPIADACEAE	<i>Asclepias subverticillata</i> (Gray) Vail	<i>Asclepias galioides</i> HBK		
111	ASCLEPIADACEAE	<i>Asclepias tuberosa</i> Linnaeus subsp. <i>interior</i> Woodson	<i>Asclepias tuberosa</i> L.		
257	ASCLEPIADACEAE	<i>Asclepias viridiflora</i> Rafinesque	<i>Acerates ivesii</i> (Britton) W. & S.		
415	ASTERACEAE	[<i>Brickellia eupatorioides</i> (Linnaeus) Shinnars var. <i>eupatorioides</i>]	<i>Kuhnia rosmarinifolia</i> Vent.		
95	ASTERACEAE	<i>Achillea millefolium</i> Linnaeus	<i>Achillea lanulosa</i> Nutt.	1909	NMC
sn	ASTERACEAE	<i>Achillea millefolium</i> Linnaeus	<i>Achillea laxiflora</i> Pollard & Cockerell	1900	US
341	ASTERACEAE	<i>Ageratina</i>	<i>Eupatorium</i>		
173	ASTERACEAE	<i>Agoseris</i>	<i>Troximon</i>		
172	ASTERACEAE	<i>Agoseris aurantiaca</i> (Hooker) Greene	<i>Agoseris purpuria</i>		
193	ASTERACEAE	<i>Ambrosia acanthicarpa</i> Hooker	<i>Gaertneria acanthicarpa</i> (Hook.) Britton		
413	ASTERACEAE	<i>Ambrosia psilostachya</i> A.P. deCandolle	<i>Ambrosia psilostachya</i> DC		
413.1	ASTERACEAE	<i>Ambrosia psilostachya</i> A.P. deCandolle	<i>Ambrosia psilostachya</i> DC		
27	ASTERACEAE	<i>Antennaria parvifolia</i> Nuttall	<i>Antennaria aprica</i> Greene		
333	ASTERACEAE	<i>Anthemis cotula</i> L.	<i>Anthemis cotula</i> L.		
356	ASTERACEAE	<i>Artemisia campestris</i> Linnaeus var. <i>caudata</i> (Michaux) Palmer & Steyermark	<i>Artemisia forwoodii</i> S. Wats.		
166	ASTERACEAE	<i>Artemisia dracunculoides</i> Linnaeus	<i>Artemisia dracunculoides</i> Pursh		
361	ASTERACEAE	<i>Artemisia franserioides</i> Greene	<i>Artemisia franserioides</i> Greene		
158	ASTERACEAE	<i>Artemisia frigida</i> Willdenow	<i>Artemisia frigida</i> Willd.	1909	NMC

125	ASTERACEAE	<i>Artemisia ludoviciana</i> Nuttall subsp. <i>ludoviciana</i>	<i>Artemisia silvicola</i> Osterh.		
468	ASTERACEAE	<i>Baccharis wrightii</i> Gray	<i>Baccharis wrightii</i> Gray		
204	ASTERACEAE	<i>Bahia dissecta</i> (Gray) Britton	<i>Villanova dissecta</i> (Gray) Rydb.		
420	ASTERACEAE	<i>Berlandiera lyrata</i> Benth.	<i>Berlandiera lyrata</i> Benth.		
261	ASTERACEAE	<i>Bidens tenuisecta</i> Gray	<i>Bidens tenuisecta</i> Gray	1909	NMC
226	ASTERACEAE	<i>Brickellia grandiflora</i> (Hooker) Nuttall	<i>Coleosanthus</i>		MO
385	ASTERACEAE	<i>Brickellia brachyphylla</i> Gray	<i>Coleosanthus brachyphyllus</i> (Gray) Kuntze		MO
325	ASTERACEAE	<i>Brickellia californica</i> (Torrey & Gray) Gray	<i>Coleosanthus reniformis</i> (Gray)		MO
278	ASTERACEAE	<i>Brickellia fendleri</i> Gray	<i>Eupatorium fendleri</i> Gray		
159	ASTERACEAE	<i>Chaetopappa ericoides</i> (Torrey) Nesom	<i>Leucelene arenosa</i> Heller		
457	ASTERACEAE	<i>Chaetopappa ericoides</i> (Torrey) Nesom	<i>Leucelene ericoides</i> (Torr.) Greene		
104	ASTERACEAE	<i>Cirsium ochrocentrum</i> Gray subsp. <i>ochrocentrum</i>	<i>Cirsium ochrocentrum</i> Gray		
176	ASTERACEAE	<i>Cirsium pallidum</i> Wooton & Standley	<i>Cirsium pallidum</i> Wooton & Standley	1914	NY
73	ASTERACEAE	<i>Cirsium undulatum</i> (Nuttall) Sprengel	<i>Cirsium undulatum</i> (Nutt.)		
318	ASTERACEAE	<i>Conyza canadensis</i> (Linnaeus) Cronquist	<i>Leptilon canadensis</i> (L.) Britton		
205	ASTERACEAE	<i>Coreopsis</i>	<i>Coreopsis</i>		
280	ASTERACEAE	<i>Cosmos parviflorus</i> (Jaquin) Humboldt, Bonpland & Kunth	<i>Cosmos parviflorus</i> HBK	1909	NMC
103.1	ASTERACEAE	<i>Cyclochaena xanthifolia</i> (Nuttall) Fresenius	<i>Iva xanthifolia</i> Nutt	1909	NMC
118	ASTERACEAE	<i>Cyclochaena xanthifolia</i> (Nuttall) Fresenius	<i>Iva xanthifolia</i> Nutt		
220	ASTERACEAE	<i>Dieteria bigelovii</i> (Gray) Morgan & Hartman	<i>Machaeranthera bigelovii</i> (Gray) Greene		
402	ASTERACEAE	<i>Dyssodia papposa</i> (Ventenat) Hitchcock	<i>Boebera papposa</i> (Vent.) Rydb.		
429	ASTERACEAE	<i>Engelmannia peristenia</i> (Rafinesque) Goodman & Lawson	<i>Engelmannia pinnatifida</i> T. & G.		
319	ASTERACEAE	<i>Ericameria nauseosa</i> (Pallas ex Pursh) Nesom & Baird var. <i>bigelovii</i> (A. Gray) Nesom & Baird	<i>Chrysothamnus</i>		US
242	ASTERACEAE	<i>Erigeron</i>	<i>Erigeron</i>		
292	ASTERACEAE	<i>Erigeron</i>	<i>Erigeron</i>		
135	ASTERACEAE	<i>Erigeron divergens</i> Torrey & Gray	<i>Erigeron divergens</i> T. & G.		
455	ASTERACEAE	<i>Erigeron divergens</i> Torrey & Gray	<i>Erigeron divergens</i> T. & G.		
15	ASTERACEAE	<i>Erigeron flagellaris</i> Gray	<i>Erigeron flagellaris</i> Gray		
88	ASTERACEAE	<i>Erigeron philadelphicus</i> Linnaeus var. <i>philadelphicus</i>	<i>Erigeron philadelphicus</i> L.		
169	ASTERACEAE	<i>Erigeron speciosus</i> (Lindley) A. P. deCandolle var. <i>macranthus</i> (Nuttall) Cronquist	<i>Erigeron speciosus</i> (Lindl.) DC.		
85	ASTERACEAE	<i>Grindelia nuda</i> Wood var. <i>aphanactis</i> (Rydb.) Nesom	<i>Grindelia aphanactis</i> Rydb.		
209	ASTERACEAE	<i>Gutierrezia sarothrae</i> (Pursh) Britton & Rusby	<i>Gutierrezia tenuis</i> Greene		
206	ASTERACEAE	<i>Helianthella quinque nervis</i> (Hooker) Gray	<i>Helianthella quinque nervis</i> Gray		
165	ASTERACEAE	<i>Helianthus</i>	<i>Helianthus</i>		
384	ASTERACEAE	<i>Helianthus</i>	<i>Helianthus</i>		
108	ASTERACEAE	<i>Helianthus annuus</i> Linnaeus	<i>Helianthus annuus</i> L.		
386	ASTERACEAE	<i>Helianthus rigidus</i> (Cassini) Desfontaines subsp. <i>subrhomboides</i> (Rydb.) Heiser	<i>Helianthus subrhomboides</i> Rydb.		
163	ASTERACEAE	<i>Heliomeris multiflora</i> Nuttall	<i>Gymnolomia multiflora</i> (Nutt.) B. & H.		
350	ASTERACEAE	<i>Heterotheca villosa</i> (Pursh) Shinnors	<i>Chrysopsis villosa</i> (Pursh) Nutt		
211	ASTERACEAE	<i>Heterotheca viscida</i> (Gray) Harms	<i>Chrysopsis viscida</i> (Gray) Greene		
243	ASTERACEAE	<i>Hieracium fendleri</i> Schultz-Bipontinus var. <i>fendleri</i>	<i>Hieracium fendleri</i> Schultz Bip.		
345	ASTERACEAE	<i>Hymenopappus</i>	<i>Hymenopappus</i>		
339	ASTERACEAE	<i>Hymenopappus filifolius</i> Hooker var. <i>lugens</i> (Greene) Jepson	<i>Hymenopappus macroglottis</i> Rydb.		
459	ASTERACEAE	<i>Hymenopappus flavescens</i> Gray	<i>Hymenopappus flavescens</i> Gray		
114	ASTERACEAE	<i>Hymenoxys richardsonii</i> (Hooker) Cockerell var. <i>richardsonii</i>	<i>Hymenoxys macrantha</i> (A. Nels.) Rydb.		
353	ASTERACEAE	<i>Lactuca canadensis</i> Linnaeus	<i>Lactuca canadensis</i> L.		
453	ASTERACEAE	<i>Lactuca graminifolia</i> Michaux var. <i>arizonica</i> McVaugh	<i>Lactuca graminifolia</i> Michx.		
449	ASTERACEAE	<i>Lactuca serriola</i> Linnaeus	<i>Lactuca integrata</i> (Gren. & Godr.) A. Nels.		
404	ASTERACEAE	<i>Lactuca tatarica</i> (Linnaeus) C.A. Meyer subsp. <i>pulchella</i> (Pursh) Stebbins	<i>Lactuca pulchella</i> DC		
284	ASTERACEAE	<i>Liatris punctata</i> Hooker	<i>Laciniaria punctata</i> (Hook.) Kuntze		
454	ASTERACEAE	<i>Machaeranthera tanacetifolia</i> (Humboldt, Bonpland, & Kunth) Nees	<i>Machaeranthera tanacetifolia</i> (HBK) Nees.		
112	ASTERACEAE	<i>Melampodium leucanthum</i> Torrey & Gray	<i>Melampodium leucanthum</i> T. & G.		
167	ASTERACEAE	<i>Oreochrysum parryi</i> (Gray) Rydb.	<i>Solidago bigelovii</i> Gray ?	1909	NMC
342	ASTERACEAE	<i>Packera fendleri</i> (A. Gray) W.A. Weber & A. Löve	<i>Senecio fendleri</i> Gray		
22	ASTERACEAE	<i>Packera neomexicana</i> (A. Gray) W.A. Weber & A. Löve var. <i>neomexicana</i>	<i>Senecio neomexicanus</i> Gray		
320	ASTERACEAE	<i>Pseudognaphalium canescens</i> (A. P. deCandolle) W.A. Weber	<i>Gnaphalium wrightii</i> Gray		
370	ASTERACEAE	<i>Psilostrophe tagetina</i> (Nuttall) Greene var. <i>tagetina</i>	<i>Psilostrophe tagetinae</i> (Nutt.) Britton		
207	ASTERACEAE	<i>Ratibida columnifera</i> (Nuttall) Wooton & Standley forma <i>columnifera</i>	<i>Ratibida columnaris</i> (Sims) Don		
113.1	ASTERACEAE	<i>Ratibida tagetes</i> (James) Barnhart	<i>Ratibida tagetes</i> (James) Barnh.	1909	NMC

208	ASTERACEAE	<i>Ratibida tagetes</i> (James) Barnhart	<i>Ratibida tagetes</i> (James) Barnh.		
175	ASTERACEAE	<i>Rudbeckia laciniata</i> Linnaeus	<i>Rudbeckia laciniata</i>		
154	ASTERACEAE	<i>Senecio bigelovii</i> Gray var. <i>bigelovii</i>	<i>Senecio bigelovii</i> Gray		
281	ASTERACEAE	<i>Senecio eremophilus</i> Richardson var. <i>kingii</i> (Rydb.) Greenman	<i>Senecio ambrosioides</i> Rydb.		
286	ASTERACEAE	<i>Senecio flaccidus</i> Lessing var. <i>flaccidus</i>	<i>Senecio filifolius</i> Nutt.		
290	ASTERACEAE	<i>Solidago simplex</i> Kunth var. <i>simplex</i>	<i>Solidago oreophila</i> Rydb.		
49	ASTERACEAE	<i>Solidago velutina</i> A.P. deCandolle	<i>Solidago trinervata</i> Greene	1909	NMC
288	ASTERACEAE	<i>Solidago wrightii</i> Gray var. <i>wrightii</i>	<i>Solidago bigelovii</i> Gray	1909	NMC
101	ASTERACEAE	<i>Sonchus asper</i> (Linnaeus) Hill	<i>Sonchus asper</i> (L.) All.		
412	ASTERACEAE	<i>Sonchus asper</i> (Linnaeus) Hill	<i>Sonchus asper</i> (L.) All.		
149	ASTERACEAE	<i>Stephanomeria minor</i> (Hooker) Nuttall	<i>Ptiloria ramosa</i> Rydb.		
408	ASTERACEAE	<i>Stephanomeria minor</i> (Hooker) Nuttall	<i>Ptiloria ramosa</i> Rydb.		
445	ASTERACEAE	<i>Stephanomeria minor</i> (Hooker) Nuttall	<i>Ptilorium ramosa</i> Rydb.		
470	ASTERACEAE	<i>Stephanomeria minor</i> (Hooker) Nuttall	<i>Ptiloria ramosa</i> Rydb.		
416	ASTERACEAE	<i>Symphyotrichum</i>	<i>Aster</i>		
87	ASTERACEAE	<i>Symphyotrichum ericoides</i> (Linnaeus) Nesom var. <i>ericoides</i>	<i>Aster hebecladus</i> DC	1909	NMC
215	ASTERACEAE	<i>Symphyotrichum laeve</i> (Linnaeus) Löve & Löve var. <i>laeve</i>	<i>Aster laevis</i> L.		
265	ASTERACEAE	<i>Tetranneuris</i>	<i>Actinella</i>		
19	ASTERACEAE	<i>Tetranneuris argentea</i> (Gray) Greene	<i>Tetranneuris leptoclada</i> (Gray) Greene		
456	ASTERACEAE	<i>Thelesperma filifolium</i> Gray var. <i>intermedium</i> (Rydb.) Shinnars	<i>Thelesperma trifida</i> (Lam.) Britton		
395	ASTERACEAE	<i>Thelesperma megapotaemicum</i> (Sprengel) Kuntze	<i>Thelesperma gracile</i>		
56	ASTERACEAE	<i>Townsendia eximia</i> Gray	<i>Townsendia eximia</i> Gray		NMC
234	ASTERACEAE	<i>Townsendia exscapa</i> (Richardson) Porter	<i>Townsendia exscapa</i> (Richards.) Porter		
81	ASTERACEAE	<i>Verbesina encelioides</i> (Cavanilles) Benth. & Hooker var. <i>exauriculata</i> B.L. Robinson & J.L. Greenman	<i>Ximenesia exauriculata</i> (Rob. & Greenman) Rydb.		
389	ASTERACEAE	<i>Viguiera dentata</i> (Cavanilles) Sprengel	<i>Viguiera helianthoides</i> HBK		
298	ASTERACEAE	<i>Xanthium strumarium</i> Linnaeus var. <i>canadense</i> (Miller) Torrey	<i>Xanthium commune</i> Britton		
113	ASTERACEAE	<i>Zinnia grandiflora</i> Nuttall	<i>Crassina grandiflora</i> (Nutt.) Kuntze		
52	BERBERIDACEAE	<i>Berberis fendleri</i> Gray	<i>Berberis fendleri</i> Gray	1909	NMC
297	BERBERIDACEAE	<i>Berberis haematocarpa</i> Wootton	<i>Odoestemon haematocarpa</i> (Wootton) Heller		
8	BERBERIDACEAE	<i>Berberis repens</i> Lindley	<i>Odoestemon repens</i> (Lindl.) Ckll		
16	BORAGINACEAE	<i>Cryptantha</i>	<i>Oreocarya</i>		
366	BORAGINACEAE	<i>Cryptantha cinerea</i> (Greene) Cronquist var. <i>cinerea</i>	<i>Oreocarya multicaulis</i> (Torr.) Greene		
463	BORAGINACEAE	<i>Cryptantha cinerea</i> (Greene) Cronquist var. <i>jamesii</i> Cronquist	<i>Oreocarya suffruticosa</i> (Torr.) Greene		
184	BORAGINACEAE	<i>Hackelia floribunda</i> (Lehmann) I. M. Johnston	<i>Lappula floribunda</i> (Lehm.) Greene		US
327	BORAGINACEAE	<i>Lithospermum incisum</i> Lehmann	<i>Lithospermum linearifolium</i> Goldie		
98	BORAGINACEAE	<i>Lithospermum multiflorum</i> Torrey ex Gray	<i>Lithospermum multiflorum</i> Torr.	1909	NMC
12	BORAGINACEAE	<i>Mertensia lanceolata</i> (Pursh.) A.P. deCandolle var. <i>nivalis</i> (S. Watson) Higgins	<i>Mertensia fendleri</i> Gray		
241	BRASSICACEAE	<i>Arabis hirsuta</i> (Linnaeus) Scopoli var. <i>pyncocarpa</i> (Hopkins) Rollins	<i>Arabis ovata</i> (Pursh) Poir.		
9	BRASSICACEAE	<i>Boechera fendleri</i> (S. Watson) W.A. Weber	<i>Arabis fendleri</i> (Gray)		
216	BRASSICACEAE	<i>Capsella bursa-pastoris</i> (Linnaeus) Medikus	<i>Bursa bursa-pastoris</i> (L.) Web.	1909	NMC
157	BRASSICACEAE	<i>Descurainia incisa</i> (Engelmann ex Gray) Britton subsp. <i>incisa</i>	<i>Sophia incisa</i> (Engelm.) Greene		
380	BRASSICACEAE	<i>Descurainia obtusa</i> (Greene) O.E. Schulz subsp. <i>obtusa</i>	<i>Sophia obtusa</i> Greene		
390	BRASSICACEAE	<i>Dimorphocarpa wislizeni</i> (Engelmann) Rollins	<i>Dithyrea</i>		
293	BRASSICACEAE	<i>Draba</i>	<i>Draba</i>		
71	BRASSICACEAE	<i>Draba helleriana</i> Greene var. <i>helleriana</i>	<i>Draba helleriana</i> Greene		MO
233	BRASSICACEAE	<i>Draba reptans</i> (Lamarck) Fernald	<i>Draba coloradensis</i> Rydb.		
132	BRASSICACEAE	<i>Erysimum capitatum</i> (Douglas ex Hooker) Greene var. <i>purshii</i> (Durand) Rollins	<i>Cheirinia asperrima</i> (Greene) Rydb.		
33	BRASSICACEAE	<i>Erysimum capitatum</i> (Douglas) Greene var. <i>capitatum</i>	<i>Cheirinia wheleri</i> (S. Wats.) Rydb.	1909	NMC
72	BRASSICACEAE	<i>Lepidium alyssoides</i> Gray var. <i>eastwoodiae</i> (Wootton) Rollins	<i>Lepidium Eastwoodiae</i> Wootton	1914	NY, NMC, MO
198	BRASSICACEAE	<i>Pennellia micrantha</i> (Gray) Nieuwland	<i>Heterothrix micrantha</i> (Gray) Rydb.		
7	BRASSICACEAE	<i>Physaria fendleri</i> (Gray) O'Kane & Al-Shebaz	<i>Lesquerella fendleri</i> (Gray) S. Wats.		
185	BRASSICACEAE	<i>Schoenocrambe linearifolia</i> (Gray) Rollins	<i>Thelypodium linearifolium</i> Gray		
452	BRASSICACEAE	<i>Thelypodopsis vaseyi</i> (S. Watson ex Robinson) Rollins	<i>Sisymbrium vaseyi</i> S. Wats.		
354	BRASSICACEAE	<i>Thelypodium</i>	<i>Thelypodium</i>		
203	BRASSICACEAE	<i>Thelypodium wrightii</i> Gray	<i>Thelypodium wrightii</i> Gray		
sn	CACTACEAE	<i>Coryphantha vivipara</i> var. <i>neomexicana</i> (Engelm.) Backeb.		1910	US
sn	CACTACEAE	<i>Coryphantha vivipara</i> var. <i>neomexicana</i> (Engelm.) Backeb.		1910	US
sn	CACTACEAE	<i>Coryphantha vivipara</i> (Nuttall) Britton & Rose		1910	US
153	CACTACEAE	<i>Coryphantha vivipara</i> (Nuttall) Britton & Rose var. <i>neomexicana</i> (Engelm.) Backeb.	<i>Mamillaria</i>	1914	US
sn	CACTACEAE	<i>Coryphantha vivipara</i> var. <i>arizonica</i> (Engelm.) Backeb.		1914	US

116	CACTACEAE	<i>Cylindropuntia imbricata</i> (Haworth) F.M. Knuth var. <i>imbricata</i>	<i>Opuntia arborescens</i> Engelm.		US
45	CACTACEAE	<i>Echinocereus coccineus</i> Engelm.	<i>Echinocereus coccineus</i> Engelm.		US
199	CACTACEAE	<i>Echinocereus coccineus</i> Engelm.	<i>Echinocereus conoideus</i> Engelm.	1914	US
sn	CACTACEAE	<i>Echinocereus fendleri</i> (Engelmann) Engelmann ex Rümper var. <i>kuenzleri</i> (Castetter, Pierce, & Schwerin) L. Benson		1914	US
147	CACTACEAE	<i>Grusonia clavata</i> (Engelm.) H. Rob.	<i>Opuntia clavata</i> Engelm.		US
110	CACTACEAE	<i>Opuntia macrorhiza</i> Engelm. var. <i>macrorhiza</i>	<i>Opuntia</i>		US
260	CACTACEAE	<i>Opuntia phaeacantha</i> Engelm. var. <i>major</i> Engelm.	<i>Opuntia</i>		US
305	CACTACEAE	<i>Opuntia phaeacantha</i> Engelm. var. <i>major</i> Engelm.			US
sn	CACTACEAE	<i>Opuntia polycantha</i> Haw. var. <i>polycantha</i>		1910	US
sn	CACTACEAE	<i>Opuntia</i> sp.		1910	US
368	CACTACEAE	<i>Pediocactus simpsonii</i> (Engelm.) Britton & Rose	<i>Pediocactus</i>		US
sn	CACTACEAE	<i>Pediocactus simpsonii</i> (Engelm.) Britton & Rose		1911	US
sn	CACTACEAE	<i>Pediocactus simpsonii</i> (Engelm.) Britton & Rose		1914	US
133	CAMPANULACEAE	<i>Campanula rotundifolia</i> Linnaeus	<i>Campanula petiolata</i> A.DC.	1914	US, NMC
447	CAMPANULACEAE	<i>Lobelia cardinalis</i> Linnaeus	<i>Lobelia splendens</i> Willd.		
270	CANNABACEAE	<i>Humulus lupulus</i> Linnaeus var. <i>neomexicanus</i> Nelson & Cockerell	<i>Humulus lupulus</i> var. <i>neomexicana</i> Nels. & Cock.		
171	CAPPARIDACEAE	<i>Cleoma serrulata</i> Pursh	<i>Peritoma serrulatum</i> (Pursh) DC.	1909	NMC
179	CAPRIFOLIACEAE	<i>Sambucus racemosa</i> Linnaeus var. <i>microbotrys</i> (Rydberg) Kearney & Peebles	<i>Sambucus microbotrys</i> Rydb.		
60	CAPRIFOLIACEAE	<i>Symphoricarpos rotundifolius</i> Gray	<i>Symphoricarpos oreophilus</i> Gray		
382	CARYOPHYLLACEAE	<i>Agrostemma githago</i> Linnaeus	<i>Lychnis githago</i>		
405	CARYOPHYLLACEAE	<i>Drymaria molluginea</i> (Lagasca) Didrichsen	<i>Drymaria sperguloides</i> Gray		
338	CARYOPHYLLACEAE	<i>Eregmone fendleri</i> (Gray) Ikonnikov	<i>Arenaria fendleri</i> Gray		
340	CARYOPHYLLACEAE	<i>Minuartia</i>	<i>Alsinoopsis</i>		
54	CARYOPHYLLACEAE	<i>Pseudostellaria jamesiana</i> W.A. Weber & R.L. Hartman	<i>Alsine jamesiana</i> (Torr.) Heller		
376	CARYOPHYLLACEAE	<i>Silene antirrhina</i> Linnaeus	<i>Silene antirrhina</i> Linnaeus		
392	CARYOPHYLLACEAE	<i>Silene antirrhina</i> Linnaeus	<i>Silene antirrhina</i> (L.)		
475	CARYOPHYLLACEAE	<i>Silene antirrhina</i> Linnaeus	<i>Silene antirrhina</i> (L.)		
212	CARYOPHYLLACEAE	<i>Silene drummondii</i> Hooker	<i>Lychnis drummondii</i> (Hook.) S. Wats.		
462	CARYOPHYLLACEAE	<i>Silene drummondii</i> Hooker var. <i>drummondii</i>	<i>Lychnis drummondii</i> (Hook.) S. Wats.		
364	CARYOPHYLLACEAE	<i>Silene noctiflora</i> Linnaeus	<i>Silene noctiflora</i> L.		
212.1	CARYOPHYLLACEAE	<i>Silene scouleri</i> Hooker subsp. <i>hallii</i>	<i>Silene hallii</i> Gray		
343	CARYOPHYLLACEAE	<i>Spergularia lanuginosa</i> (Michaux) subsp. <i>saxosa</i> (Gray) Weber	<i>Arenaria confusa</i> Rydb.		
328	CARYOPHYLLACEAE	<i>Stellaria media</i> (Linnaeus) Cyrillo	<i>Alsine media</i> L.		
387	CARYOPHYLLACEAE	<i>Vaccaria hispanica</i> (Miller) Rauschert	<i>Vaccaria vaccaria</i> (L.) Britton		
35	CELASTRACEAE	<i>Pachystima myrsinites</i> (Pursh) Rafinesque	<i>Pachystima myrsinites</i> (Pursh) Raf.		
162	CHENOPODIACEAE	<i>Atriplex canescens</i> (Pursh) Nuttall	<i>Atriplex canescens</i> (Pursh) Nutt.		
144	CHENOPODIACEAE	<i>Chenopodium album</i> Linnaeus	<i>Chenopodium pagani</i> Reichenb.		
145	CHENOPODIACEAE	<i>Chenopodium capitatum</i> (Linnaeus) Ambrosi var. <i>parvicapitatum</i> S.L. Welsh	<i>Blitum capitatum</i> L.		
410	CHENOPODIACEAE	<i>Chenopodium incanum</i> (S. Watson) Heller	<i>Chenopodium incanum</i> (S. Wats.) Heller		
394	CHENOPODIACEAE	<i>Chenopodium simplex</i> (Torrey) Rafinesque	<i>Chenopodium hybridum</i> L.		
228	CHENOPODIACEAE	<i>Dysphania graveolens</i> (Willdenow) Mosyakin & Clemants	<i>Chenopodium cornutum</i> (Torr.) B. & H.	1909	NMC
344	CHENOPODIACEAE	<i>Krascheninnikovia lanata</i> (Pursh) Meeuse & Smits	<i>Eurotia subspinosus</i> Rydb.	1909	NMC
369	CHENOPODIACEAE	<i>Salsola tragus</i> Linnaeus	<i>Salsola pestifer</i> A. Nels.		
174	COMMELINACEAE	<i>Commelina dianthifolia</i> Delile	<i>Commelina dianthifolia</i> [DC.]	1914	US, NMC
439	CONVOLVULACEAE	<i>Convolvulus equitans</i> Benth	<i>Convolvulus incanus</i> Vahl.		
461	CONVOLVULACEAE	<i>Evolvulus nuttallianus</i> Roemer & Schultes	<i>Evolvulus nuttallianus</i> R. & S.		
276	CONVOLVULACEAE	<i>Ipomoea cristulata</i> H. Hall	<i>Quamoclit coccinea</i> (L.) Moench.		
275	CONVOLVULACEAE	<i>Ipomoea purpurea</i> (Linnaeus) Roth	<i>Ipomoea hirsutula</i> Jacq.		
37.1	CORNACEAE	<i>Cornus sericea</i> Linnaeus subsp. <i>sericea</i>	<i>Cornus instolonea</i> A. Nels.	1909	NMC
217	CRASSULACEAE	<i>Sedum cockerellii</i> Britton	<i>Sedum wootonii</i> Britton		
50	CRASSULACEAE	<i>Sedum rhodanthum</i> Gray	<i>Sedum rhodanthum</i> Gray		
285	CUCURBITACEAE	<i>Cucurbita foetidissima</i> Humboldt, Bonpland, & Kunth	<i>Cucurbita foetidissima</i> HBK		
224	CUSCUTACEAE	<i>Cuscuta megalocarpa</i> Rydberg	<i>Cuscuta curta</i> Engelm.		
17.1	CYPERACEAE	<i>Carex heliophila</i> Mack.		1914	MO
34.1	CYPERACEAE	<i>Carex wootonii</i> Mack.		1914	MO
4.1	ERICACEAE	<i>Monotropa hypopitys</i> Linnaeus	<i>Monotropa hypopitys</i> Linnaeus	1908	NMC
282	ERICACEAE	<i>Monotropa hypopitys</i> Linnaeus	<i>Hypopitys latissima</i> Rydb.	1909	NMC
218	ERICACEAE	<i>Orthilia secunda</i> (Linnaeus) House	<i>Pyrola secunda</i> L.		
337	ERICACEAE	<i>Pterospora andromedea</i> Nuttall	<i>Pterospora andromedea</i> Nuttall		
219	ERICACEAE	<i>Pyrola chlorantha</i> Swartz	<i>Pyrola chlorantha</i>		
187	EUPHORBIACEAE	<i>Chamaesyce fendleri</i> (Torrey & Gray) Small var. <i>fendleri</i>	<i>Chamaesyce fendleri</i> (T. & G.) Small		
335	EUPHORBIACEAE	<i>Chamaesyce revoluta</i> (Engelmann) Small	<i>Euphorbia revoluta</i>		US
188	EUPHORBIACEAE	<i>Chamaesyce serpyllifolia</i> (Persoon) Small	<i>Chamaesyce serpyllifolia</i> (Pers.)		

			Small		
274	EUPHORBIACEAE	<i>Chamaesyce stictospora</i> (Engelmann) Small	<i>Chamaesyce stictospora</i> (Englm.) Small		
359	EUPHORBIACEAE	<i>Croton texensis</i> (Klotzsch) Müller Argoviensis	<i>Croton texensis</i> (Klotzsch) Muel. Arg.		
5	EUPHORBIACEAE	<i>Euphorbia brachycera</i> Engelmann	<i>Tithymalus robustus</i> (Engelm.) Small		
332	EUPHORBIACEAE	<i>Euphorbia davidii</i> Subils	<i>Poinsettia dentata</i> (Michx.) Small		
67	EUPHORBIACEAE	<i>Tragia ramosa</i> Torrey	<i>Tragia ramosa</i> Torr.		
365	FABACEAE	<i>Astragalus</i>	<i>Astragalus</i>		
428	FABACEAE	<i>Astragalus agrestis</i> Douglas ex G. Don	<i>Astragalus goniatus</i> Nutt.		
427	FABACEAE	<i>Astragalus gracilis</i> Nuttall	<i>Astragalus microlobus</i>		
422	FABACEAE	<i>Astragalus humistratus</i> Gray var. <i>humistratus</i>	<i>Astragalus humistratus</i> Gray		
434	FABACEAE	<i>Astragalus missouriensis</i> Nuttall var. <i>missouriensis</i>	<i>Astragalus missouriensis</i> Nutt.		
419	FABACEAE	<i>Astragalus mollissimus</i> Torrey var. <i>mollissimus</i>	<i>Astragalus mollissimus</i> Torr.		
421	FABACEAE	<i>Astragalus praelongus</i> Sheldon var. <i>ellisiae</i> (Rydberg) Barneby	<i>Astragalus praelongus</i> Sheld.	1914	US, NY, MO
52	FABACEAE	<i>Astragalus scopulorum</i> T.C. Porter	<i>Tium scopulorum</i> (Porter) Rydberg	1908	NMC
326	FABACEAE	<i>Astragalus scopulorum</i> T.C. Porter	<i>Tium stenolobum</i> Rydb.	1914	US, NY, MO
471	FABACEAE	<i>Calliandra humilis</i> Benth. var. <i>humilis</i>	<i>Calliandra humilis</i> Benth.		
86	FABACEAE	<i>Dalea candida</i> Willdenow var. <i>oligophylla</i> (Torrey) Shinners	<i>Petalostemon oligophyllum</i> (Torr.) Rydb.	1909	NMC
131	FABACEAE	<i>Dalea formosa</i> Torrey	<i>Parosela formosa</i>		
155	FABACEAE	<i>Dalea leporina</i> (Aiton) Bullock	<i>Parosela dalea</i> (L.) Britton	1909	NMC
264	FABACEAE	<i>Dalea tenuifolia</i> (Gray) Shinners	<i>Petalostemon tenuifolium</i> Gray		
424	FABACEAE	<i>Lathyrus eucosmus</i> Butters & St. John	<i>Lathyrus decaphyllus</i> Pursh.		
21	FABACEAE	<i>Lathyrus leucanthus</i> Rydb.	<i>Lathyrus leucanthus</i> Rydb.		
12	FABACEAE	<i>Lotus wrightii</i> (A. Gray) Greene		1908	NMC
106	FABACEAE	<i>Lotus wrightii</i> (Gray) Greene	<i>Lotus wrightii</i> (Gray) Greene	1909	NMC
430	FABACEAE	<i>Lupinus kingii</i> S. Watson	<i>Lupinus kingii</i> S. Wats.		
236	FABACEAE	<i>Lupinus argenteus</i> Pursh var. <i>argophyllus</i> (Gray) S. Watson	<i>Lupinus aduncus</i> Greene		
89	FABACEAE	<i>Lupinus sericeus</i> Pursh	<i>Lupinus bakeri</i> Greene	1909	UNM
436	FABACEAE	<i>Medicago lupulina</i> Linnaeus	<i>Medicago lupulina</i> L.		
440	FABACEAE	<i>Melilotus indicus</i> (Linnaeus) Allioni	<i>Melilotus indica</i> (L.) All		
91	FABACEAE	<i>Oxytropis lambertii</i> Pursh	<i>Oxytropis lambertii</i> Pursh		
271	FABACEAE	<i>Psoraleidium tenuiflorum</i> (Pursh) Rydberg	<i>Psoralea tenuiflora</i> Pursh		
77	FABACEAE	<i>Robinia neomexicana</i> Gray var. <i>neomexicana</i>	<i>Robinia neomexicana</i> Gray		
268	FABACEAE	<i>Sophora</i>	<i>Sophora</i>		
40	FABACEAE	<i>Thermopsis rhombifolia</i> (Nuttall ex Pursh) Nuttall ex Richardson var. <i>divaricarpa</i> (A. Nelson) Isely	<i>Thermopsis pinetorum</i> Greene	1909	NMC
90	FABACEAE	<i>Trifolium attenuatum</i> Greene	<i>Trifolium stenolobum</i> Rydb.		
423	FABACEAE	<i>Trifolium gymnocarpon</i> Nuttall	<i>Trifolium subcaulescens</i> Gray		
65	FABACEAE	<i>Vicia americana</i> Muhleberg ex Willdenow	<i>Vicia americana</i> Muhl.		
321	FABACEAE	<i>Vicia ludoviciana</i> Nuttall ex Torrey & Gray subsp. <i>ludoviciana</i>	<i>Vicia producta</i> Rydb.		
6	FUMARIACEAE	<i>Corydalis aurea</i> Willdenow subsp. <i>aurea</i>	<i>Capnoides aureum</i> (Willd.) Kuntze		
152	GENTIANACEAE	<i>Frasera speciosa</i> Douglas ex Grisebach	<i>Frasera speciosa</i> Dougl.		
195	GENTIANACEAE	<i>Gentiana bigelovii</i> Gray	<i>Gentiana bigelovii</i>		
213	GENTIANACEAE	<i>Gentiana bigelovii</i> Gray	<i>Dasystephania bigelovii</i> (Gray) Rydb.	1909	NMC
225	GENTIANACEAE	<i>Gentianella amarella</i> (Linnaeus) Boerner subsp. <i>heterosepala</i> (Engelmann) Gillett	<i>Amarella heterosepala</i> (Engelm.) Greene	1909	NMC
1	GERANIACEAE	<i>Erodium cicutarium</i> (Linnaeus) L'Heretier ex Aiton	<i>Erodium cicutarium</i> (L.) L'Her	1909	NMC
109	GERANIACEAE	<i>Geranium caespitosum</i> James	<i>Geranium atropurpureum</i> Heller		
61	GERANIACEAE	<i>Geranium richardsonii</i> Fischer & Trautvetter	<i>Geranium richardsonii</i> F. & M.		
186	GROSSULARIACEAE	<i>Ribes inerme</i> Rydberg	<i>Grossularia inermis</i> (Rydb.) C. & B.		
14	GROSSULARIACEAE	<i>Ribes montigenum</i> McClatchie	<i>Ribes montigenum</i> McClatchie		
62	GROSSULARIACEAE	<i>Ribes wolfii</i> Rothrock	<i>Ribes wolfii</i> Rothr.		
38	HYDRANGEACEAE	<i>Fendlera rupicola</i> Gray var. <i>rupicola</i>	<i>Fendlera rupicola</i> Engelm. & Gray		
78	HYDRANGEACEAE	<i>Jamesia americana</i> Torrey & Gray var. <i>americana</i>	<i>Edwinia americanus</i> (T. & G.) Heller		
107	HYDRANGEACEAE	<i>Philadelphus microphyllus</i> Gray subsp. <i>microphyllus</i>	<i>Philadelphus microphyllus</i> Gray		
34	HYDROPHYLLACEAE	<i>Hydrophyllum fendleri</i> (Gray) Heller var. <i>fendleri</i>	<i>Hydrophyllum fendleri</i> (Gray) Heller		
79	HYDROPHYLLACEAE	<i>Phacelia</i>	<i>Phacelia</i>		
80	HYDROPHYLLACEAE	<i>Phacelia</i>	<i>Phacelia</i>		
121	HYDROPHYLLACEAE	<i>Phacelia alba</i> Rydberg	<i>Phacelia alba</i> Rydb.		
150	HYDROPHYLLACEAE	<i>Phacelia heterophylla</i> Pursh	<i>Phacelia heterophylla</i> Pursh		
94	IRIDACEAE	<i>Iris missouriensis</i> Nuttall	<i>Iris missouriensis</i> Nutt.		
249	IRIDACEAE	<i>Sisyrinchium idahoense</i> Bicknell var. <i>occidentale</i> (Bicknell) D.M. Henderson	<i>Sisyrinchium occidentale</i> Bickn.		
291	LAMIACEAE	<i>Agastache pallidiflora</i> (Heller) Rydberg subsp. <i>neomexicana</i> (Briquet) Lint & Eppling var. <i>neomexicana</i> (Briquet) R. Sanders	<i>Agastache neomexicana</i> (Briq.) Standley	1909	NMC, NY, MO

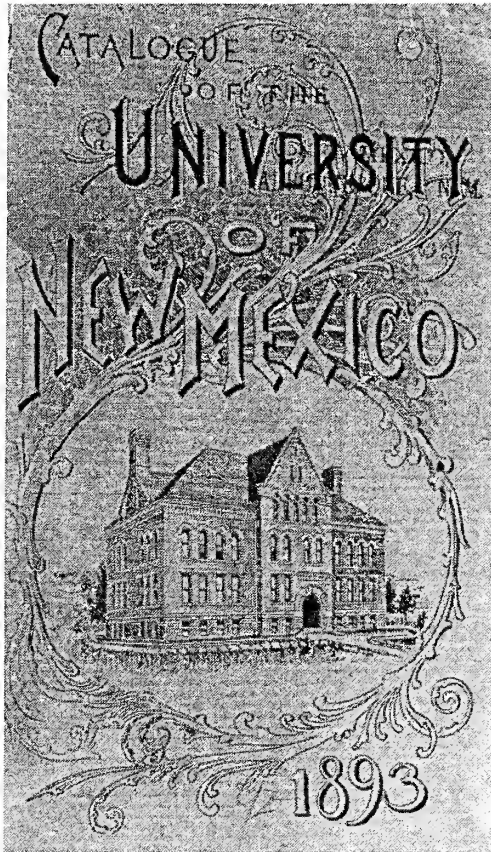
100	LAMIACEAE	<i>Dracocephalum parviflorum</i> Nuttall	<i>Dracocephalum parviflorum</i> Nuttall	1909	NMC
66	LAMIACEAE	<i>Hedeoma nana</i> (Torrey) Briquet	<i>Hedeoma nana</i> (Torrey) Greene		
388	LAMIACEAE	<i>Hedeoma oblongifolia</i> (Gray) Heller	<i>Hedeoma oblongifolia</i>		
411	LAMIACEAE	<i>Lycopus asper</i> Greene	<i>Lycopus lucidus</i> Turcz.		
140	LAMIACEAE	<i>Monarda fistulosa</i> Linnaeus var. <i>menthifolia</i> (Graham) Fernald	<i>Monarda stricta</i> Wootton	1909	NMC
448	LAMIACEAE	<i>Monarda pectinata</i> Nuttall	<i>Monarda pectinata</i> Nutt.		
432	LAMIACEAE	<i>Prunella vulgaris</i> Linnaeus var. <i>lanceolata</i>	<i>Prunella vulgaris</i> L.		
379	LAMIACEAE	<i>Teucrium laciniatum</i> Torrey	<i>Melosmon laciniatum</i> (Torrey) Small		
210	LILIACEAE	<i>Allium cernuum</i> Roth	<i>Allium recurvatum</i> Rydb.		
161	LILIACEAE	<i>Allium geyeri</i> S. Watson var. <i>geyeri</i>	<i>Allium geyeri</i> S. Wats.		
433	LILIACEAE	<i>Allium macropetalum</i> Rydberg	<i>Allium reticulatum</i> Fraser		
238	LILIACEAE	<i>Calochortus gunnisonii</i> S. Watson var. <i>gunnisonii</i>	<i>Calochortus gunnisonii</i> S. Wats.		
25	LILIACEAE	<i>Maianthemum racemosum</i> (Linnaeus) Link subsp. <i>amplexicaule</i> (Nuttall) LaFrankie	<i>Vagnera racemosa</i> (L.) Morong		
39	LILIACEAE	<i>Maianthemum stellatum</i> (Linnaeus) Link	<i>Vagnera stellata</i> (L.) Morong		
181	LILIACEAE	<i>Zigadenus elegans</i> Pursh	<i>Anticlea elegans</i> (Pursh) Rydb.		
160	LINACEAE	<i>Linum lewisii</i> Pursh	<i>Linum lewisii</i> Pursh		
168	LINACEAE	<i>Linum puberulum</i> (Engelmann) Heller	<i>Linum puberulum</i> Engelm.		
250	LOASACEAE	<i>Mentzelia albicaulis</i> Douglas ex Hooker	<i>Acrolasia parviflora</i> Heller		
170	LOASACEAE	<i>Mentzelia multiflora</i> (Nuttall) Gray	<i>Nuttallia multiflora</i> (Nutt.) Greene		
2	MALVACEAE	<i>Iliamna grandiflora</i> (Rydberg) Wiggins		1908	UNM
300	MALVACEAE	<i>Iliamna grandiflora</i> (Rydberg) Wiggins	<i>Phymosia grandiflora</i> Rydb.		
214	MALVACEAE	<i>Sidalcea candida</i> Gray var. <i>candida</i>	<i>Sidalcea candida</i> Gray	1909	NMC
244	MALVACEAE	<i>Sidalcea neomexicana</i> Gray	<i>Sidalcea neomexicana</i> Gray	1909	NMC
41	MALVACEAE	<i>Sphaeralcea fendleri</i> Gray	<i>Sphaeralcea fendleri</i> Gray		NY, MO
235	NYCTAGINACEAE	<i>Abronia fragrans</i> Nuttall ex Hooker	<i>Abronia fendleri</i>		
409	NYCTAGINACEAE	<i>Mirabilis linearis</i> (Pursh) Heimerl var. <i>subhispidata</i> (Heimerl) Spellenberg	<i>Allionia subhispidata</i> (Heimerl) Standley		
141	NYCTAGINACEAE	<i>Mirabilis melanotricha</i> (Standley) Spellenberg	<i>Allionia melanotricha</i> Standley		
283	NYCTAGINACEAE	<i>Mirabilis multiflora</i> (Torrey) Gray	<i>Quamoclidion multiflorum</i> Torr.		
279	NYCTAGINACEAE	<i>Mirabilis oxybaphoides</i> (Gray) Gray	<i>Allionella oxybaphoides</i> (Gray) Rydb.	1909	NMC
372	OLEACEAE	<i>Menodora scabra</i> Gray	<i>Menodora scabra</i> Gray		
435	ONAGRACEAE	<i>Calyophus hartwegii</i> (Benth) Raven subsp. <i>fendleri</i> (Gray) Towner & Raven	<i>Galpinsia fendleri</i> (Gray) Heller		
191	ONAGRACEAE	<i>Chamerion angustifolium</i> (Linnaeus) Holub subsp. <i>circumvagum</i> Mosquin	<i>Chamaenerion angustifolium</i> (L.) Scop.		
360	ONAGRACEAE	<i>Epilobium brachycarpum</i> C. Presl	<i>Epilobium paniculatum</i> Nutt.		
183	ONAGRACEAE	<i>Epilobium ciliatum</i> Rafinesque	<i>Epilobium novomexicanum</i> Hausskn.		
117	ONAGRACEAE	<i>Gaura coccinea</i> Nuttall ex Pursh	<i>Gaura coccinea</i> Nutt.		
352	ONAGRACEAE	<i>Gaura mollis</i> James	<i>Gaura parviflora</i> Dougl.		
442	ONAGRACEAE	<i>Oenothera albicaulis</i> Pursh	<i>Anogra albicaulis</i> (Pursh) Britton	1914	US
84	ONAGRACEAE	<i>Oenothera caespitosa</i> Nuttall ex Fraser subsp. <i>macroglottis</i> (Rydberg) W.L. Wagner, Stockhouse & Klein	<i>Pachylophus hirsutus</i> Rydb.	1914	US
375	ONAGRACEAE	<i>Oenothera coronopifolia</i> Torrey & Gray	<i>Anogra coronopifolia</i> (T. & G.) Britton	1914	US
sn	ONAGRACEAE	<i>Oenothera coronopifolia</i> Torrey & Gray		1892	US
438	ONAGRACEAE	<i>Oenothera elata</i> Kunth subsp. <i>hirsutissima</i> (A. Gray ex S. Watson) Dietrich	<i>Oenothera hookeri</i> T. & G.		
231	ONAGRACEAE	<i>Oenothera pallida</i> Lindley subsp. <i>pallida</i>	<i>Anogra pallida</i> (Lindl.) Britton		
137	ONAGRACEAE	<i>Oenothera villosa</i> Thunberg subsp. <i>strigosa</i> W. Dietrich & P. H. Raven	<i>Oenothera procera</i> Wootton & Standley		
194	ORCHIDACEAE	<i>Calypso bulbosa</i> (Linnaeus) Oakes var. <i>americana</i> (R. Brown ex Aiton f.) Luer	<i>Cytherea bulbosa</i> (L.) House	1914	US
201	ORCHIDACEAE	<i>Corallorhiza maculata</i> (Raf.) Raf.	<i>Corallorhiza vreelandii</i> Rydb. ?		US
306	ORCHIDACEAE	<i>Corallorhiza striata</i> Lindley	<i>Peramium</i>	1914	US
177	ORCHIDACEAE	<i>Goodyera oblongifolia</i> Rafinesque	<i>Peramium menziesii</i> (Lindl.) Morong	1914	US
136	ORCHIDACEAE	<i>Platanthera hyperborea</i> (Linnaeus) Lindley var. <i>hyperborea</i>	<i>Linnorchis laxiflora</i> Rydb.	1914	US
48	OROBANCHACEAE	<i>Conopholis alpina</i> Leibman var. <i>mexicana</i> (Gray ex S. Watson) Haynes	<i>Conopholis</i>		
248	OROBANCHACEAE	<i>Orobanche fasciculata</i> Nuttall	<i>Thalesia fasciculata</i>		
460	OROBANCHACEAE	<i>Orobanche ludoviciana</i> Nuttall subsp. <i>multiflora</i> (Nuttall) Collins ex H.L. White & W.C. Holmes	<i>Myzorrhiza multiflora</i> (Nutt.) Rydb.		
75	OXALIDACEAE	<i>Oxalis alpina</i> (Rose) Rose ex R. Knuth	<i>Oxalis</i>		US
128	PLANTAGINACEAE	<i>Plantago major</i> Linnaeus	<i>Plantago major</i> L.		
223	PLANTAGINACEAE	<i>Plantago patagonica</i> Joaquin	<i>Plantago purshii</i> R. & S.		
7.2	POACEAE	<i>Agrostis hymenialis</i> (Walter) Britton, Sterns & Poggenb.		1914	MO
28.1	POACEAE	<i>Andropogon gerardii</i> Vitman		1914	MO
22.1	POACEAE	<i>Aristida purpurea</i> var. <i>fendleriana</i> (Steud) Vasey		1914	MO
4.2	POACEAE	<i>Bouteloua curtipendula</i> (Michx.) Torr.		1914	MO
19.1	POACEAE	<i>Bromus lanatipes</i> (Shear) Rydb.		1914	MO

29.1	POACEAE	<i>Cenchrus longispinus</i> (Hack.) Fernald		1914	MO
6.2	POACEAE	<i>Elymus canadensis</i> L. var. <i>canadensis</i>		1914	MO
9.1	POACEAE	<i>Elymus trachycaulis</i> (Link) Gould ex Shimmers		1914	MO
57.1	POACEAE	<i>Elytrigia smithii</i> (Rydb.) A. Love		1914	MO
11.2	POACEAE	<i>Eragrostis cilianensis</i> (Bellardi) Vignolo ex Janch		1914	MO
31.1	POACEAE	<i>Festuca brachyphylla</i> Schult. & Schult. f.		1914	MO
38.1	POACEAE	<i>Hilaria jamesii</i> (Torr.) Benth.		1914	MO
5.3	POACEAE	<i>Koeleria macrantha</i> (Ledeb.) Schult.		1914	MO
20.1	POACEAE	<i>Lycurus setosus</i> (Nutt.) C. Reeder		1914	MO
13.2	POACEAE	<i>Muhlenbergia montana</i> (Nutt.) Hitchc.		1914	MO
18.1	POACEAE	<i>Muhlenbergia racemosa</i> (Michx.) Britton, Sterns & Poggenb.			
25.1	POACEAE	<i>Muhlenbergia torreyi</i> (Kunth) Hitchc. ex Bush		1914	MO
32.1	POACEAE	<i>Muhlenbergia wrightii</i> Vasey ex J.M. Coul.		1914	MO
12.1	POACEAE	<i>Munroa squarrosa</i> (Nutt.) Torr.		1914	MO
21.1	POACEAE	<i>Panicum anceps</i> Michx.		1914	MO
sn	POACEAE	<i>Polypogon viridis</i> (Gouan) Breistr.		1914	MO
3.5	POACEAE	<i>Schedonnardus paniculatus</i> Branner & Coville		1911	MO
sn	POACEAE	<i>Setaria viridis</i> (L.) P. Beauv.		1914	MO
sn	POACEAE	<i>Vulpia octoflora</i> var. <i>hirtella</i> (Piper) Henrard		1914	MO
272	POLEMONIACEAE	<i>Collomia linearis</i> Nuttall	<i>Collomia linearis</i> Nutt.		
391	POLEMONIACEAE	<i>Gilia</i>	<i>Gilia</i>		
237	POLEMONIACEAE	<i>Gilia inconspicua</i> (J.E. Smith) Sweet	<i>Gilia inconspicua</i> (Smith) Dougl.		
130	POLEMONIACEAE	<i>Giliastrum acerosum</i> (A. Gray) Rydberg	<i>Gilia acerosa</i> (Gray) Britton		
139	POLEMONIACEAE	<i>Ipomopsis aggregata</i> (Pursh) V. Grant	<i>Gilia aggregata</i> (Pursh) Spreng.	1909	NMC
458	POLEMONIACEAE	<i>Ipomopsis pumila</i> (Nuttall) V. Grant	<i>Gilia pumila</i> Nutt.		
156	POLEMONIACEAE	<i>Linanthastrum nuttallii</i> (A.Gray) Ewan	<i>Gilia nuttallii</i>		
232	POLEMONIACEAE	<i>Microsteris gracilis</i> (Hooker) Greene	<i>Microsteris micrantha</i> (Kell.) Greene		
266	POLEMONIACEAE	<i>Phlox nana</i> Nuttall	<i>Phlox nana</i> Nutt.		
473	POLEMONIACEAE	<i>Phlox nana</i> Nuttall	<i>Phlox nana</i> Nutt.		
312	POLEMONIACEAE	<i>Polemonium</i>	<i>Polemonium</i>		
6.1	POLEMONIACEAE	<i>Polemonium brandegeei</i> (Gray) Greene	<i>Polemonium mellitum</i> (Gray) A. Nels.	1908	NMC
93	POLEMONIACEAE	<i>Polemonium brandegeei</i> (Gray) Greene	<i>Polemonium mellitum</i> (Gray) A. Nels.		
96	POLEMONIACEAE	<i>Polemonium foliosissimum</i> Gray	<i>Polemonium foliosissimum</i> Gray		
3.2	POLEMONIACEAE	<i>Polemonium foliosissimum</i> Gray var. <i>foliosissimum</i>	<i>Polemonium grande</i> Greene	1908	NMC
119	POLYGALACEAE	<i>Polygala alba</i> Nuttall	<i>Polygala alba</i> Nutt.		
414	POLYGONACEAE	<i>Eriogonum</i>	<i>Eriogonum</i>		
451.1	POLYGONACEAE	<i>Eriogonum</i>	<i>Eriogonum</i>		
476	POLYGONACEAE	<i>Eriogonum abertianum</i> Torrey in Emory var. <i>cyclosepalum</i> (Greene) Fosberg	<i>Eriogonum abertianum</i> Torr.		
30	POLYGONACEAE	<i>Eriogonum alatum</i> Torrey in Sitgreaves var. <i>alatum</i>	<i>Eriogonum alatum</i> Torr.	1909	NMC
331.1	POLYGONACEAE	<i>Eriogonum polycladon</i> Benth	<i>Eriogonum polycladon</i> Benth.		
142	POLYGONACEAE	<i>Eriogonum racemosum</i> Nuttall	<i>Eriogonum racemosum</i> Nutt.		
29	POLYGONACEAE	<i>Eriogonum wrightii</i> Torr.	<i>Eriogonum wrightii</i> Torr.		
273	POLYGONACEAE	<i>Fagopyrum esculentum</i> Moench	<i>Fagopyrum fagopyrum</i>		
182	POLYGONACEAE	<i>Polygonum convolvulus</i> Linnaeus var. <i>convolvulus</i>	<i>Tinaria convolvulus</i> Webb & Moq.	1909	NMC
190	POLYGONACEAE	<i>Polygonum convolvulus</i> Linnaeus var. <i>convolvulus</i>	<i>Bilderdykia convolvulus</i> (L.) Greene		
200	POLYGONACEAE	<i>Polygonum persicaria</i> Linnaeus	<i>Persicaria persicaria</i> (L.) Small		
316	POLYGONACEAE	<i>Polygonum ramosissimum</i> Michaux	<i>Polygonum ramosissimum</i> Michx.		
331	POLYGONACEAE	<i>Polygonum ramosissimum</i> Michaux subsp. <i>ramosissimum</i>	<i>Polygonum exsertum</i> Small		
464	POLYGONACEAE	<i>Rumex acetosella</i> Linnaeus	<i>Rumex acetosella</i> L.		
259	POLYGONACEAE	<i>Rumex crispus</i> Linnaeus subsp. <i>crispus</i>	<i>Rumex crispus</i> L.		MO
57	PORTULACAEAE	<i>Claytonia</i>	<i>Claytonia</i>		
314	PORTULACAEAE	<i>Talinum</i>	<i>Talinum</i>		
13	PRIMULACEAE	<i>Androsace septentrionalis</i> Linnaeus	<i>Androsace diffusa</i> Small	1909	NMC
330	PRIMULACEAE	<i>Dodecatheon dentatum</i> Hooker var. <i>ellisiae</i> (Standley) N. Holmgren	<i>Dodecatheon ellisiae</i> Standley	1913	US
3.1	PRIMULACEAE	<i>Primula ellisiae</i> Pollard & Cockerell	<i>Primula ellisiae</i> Pollard & Cockerell	1900	US
180	PRIMULACEAE	<i>Primula ellisiae</i> Pollard & Cockerell	<i>Primula ellisiae</i> Pollard & Ckll.		
441	RANUNCULACEAE	[<i>Delphinium wootonii</i> Rydberg]	<i>Delphinium camporum</i> Greene		
178	RANUNCULACEAE	<i>Aconitum columbianum</i> Nuttall subsp. <i>columbianum</i>	<i>Aconitum porrectum</i> Rydb.	1909	NMC
28	RANUNCULACEAE	<i>Actaea rubra</i> (Aiton) Willdenow subsp. <i>arguta</i> (Nuttall) Hultén	<i>Actaea viridiflora</i> Greene		
164	RANUNCULACEAE	<i>Anemone cylindrica</i> Gray	<i>Anemone cylindrica</i> Gray		
443	RANUNCULACEAE	<i>Anemone cylindrica</i> Gray	<i>Anemone cylindrica</i> Gray		
230	RANUNCULACEAE	<i>Aquilegia caerulea</i> Gray	<i>Aquilegia caerulea</i> Gray	1909	NMC
310	RANUNCULACEAE	<i>Aquilegia chrysantha</i> Gray	<i>Aquilegia chrysantha</i> Gray	1909	NMC
47	RANUNCULACEAE	<i>Aquilegia elegantula</i> Greene	<i>Aquilegia elegantula</i> Greene	1909	NMC
18	RANUNCULACEAE	<i>Clematis bigelovii</i> Torrey	<i>Viorna bigelovii</i> (Torr.) Heller	1914	MO
31	RANUNCULACEAE	<i>Clematis columbiana</i> (Nuttall) Torrey & Gray	<i>Atragene pseudoalpina</i> (Kuntze) Rydb.		
129	RANUNCULACEAE	<i>Clematis ligusticifolia</i> Nuttall	<i>Clematis ligusticifolia</i> Nutt.	1909	NMC

444	RANUNCULACEAE	<i>Clematis ligusticifolia</i> Nuttall	<i>Clematis ligusticifolia</i> Nutt.		
348	RANUNCULACEAE	<i>Delphinium sapellonis</i> Cockerell	<i>Delphinium sapellonis</i> Ckll.		
431	RANUNCULACEAE	<i>Delphinium scaposum</i> Greene	<i>Delphinium scaposum</i> Greene		
323	RANUNCULACEAE	<i>Myosurus minimus</i> Linnaeus	<i>Myosurus minimus</i> L.	1909	NMC
4	RANUNCULACEAE	<i>Pulsatilla patens</i> (Linnaeus) P. Miller subsp. <i>multifida</i> (Pritzel) Zamelis	<i>Pulsatilla hirsutissima</i> (Pursh) Britton		
70	RANUNCULACEAE	<i>Ranunculus cymbalaria</i> Pursh	<i>Halerpestes cymbalaria</i> (Pursh) Greene		
3	RANUNCULACEAE	<i>Ranunculus inamoenus</i> Greene var. <i>inamoenus</i>	<i>Ranunculus inamoenus</i> Greene		
64	RANUNCULACEAE	<i>Thalictrum fendleri</i> Engelmann ex Gray	<i>Thalictrum fendleri</i> Engelm.	1909	NMC
192	RANUNCULACEAE	<i>Trautvetteria carolinensis</i> (Walter) Vail	<i>Trautvetteria grandis</i>		
97	RHAMNACEAE	<i>Ceanothus fendleri</i> Gray	<i>Ceanothus fendleri</i> Gray	1909	NMC
255	ROSACEAE	<i>Agrimonia striata</i> Michaux	<i>Agrimonia striata</i> Michx.		
26	ROSACEAE	<i>Amelanchier utahensis</i> Koehne	<i>Amelanchier mormonica</i> Koehne		
58	ROSACEAE	<i>Cercocarpus montanus</i> Rafinesque var. <i>argenteus</i> (Rydberg) F.L. Martin	<i>Cercocarpus argenteus</i> Rydb.		
99	ROSACEAE	<i>Crataegus erythropoda</i> Ashe	<i>Crataegus erythropoda</i> Ashe		
83	ROSACEAE	<i>Fallugia paradoxa</i> (D. Don) Endlicher ex Torrey	<i>Fallugia paradoxa</i> Don.		
11.1	ROSACEAE	<i>Fragaria vesca</i> Linnaeus	<i>Fragaria bracteata</i> Heller		
32	ROSACEAE	<i>Fragaria virginiana</i> Duchesne	<i>Fragaria ovalis</i> (Lehm.) Rydb.		
127	ROSACEAE	<i>Geum aleppicum</i> Jacquini	<i>Geum strictum</i> Ait		
143	ROSACEAE	<i>Holodiscus dumosa</i> (Nuttall) Heller	<i>Seriotheca dumosa</i> (Nutt.) Rydb.	1909	NMC
92	ROSACEAE	<i>Pentaphylloides fruticosa</i> (Linnaeus) O. Schwarz	<i>Dasiphora fruticosa</i> (L.) Rydb.		
124	ROSACEAE	<i>Physocarpus monogynus</i> (Torrey) Coulter	<i>Opulaster monogynus</i> (Tor.) Kuntze		
311	ROSACEAE	<i>Potentilla anserina</i> Linnaeus	<i>Argentina anserina</i> (L.) Rydb.		
82	ROSACEAE	<i>Potentilla gracilis</i> Douglas ex Hooker var. <i>pulcherrima</i> (Lehmann) Fernald	<i>Potentilla pulcherrima</i> Lehm.	1909	NMC
126	ROSACEAE	<i>Potentilla hippiana</i> Lehmann var. <i>diffusa</i> Lehmann	<i>Potentilla propinqua</i> Rydb.	1909	NMC
355	ROSACEAE	<i>Potentilla pensylvanica</i> Linnaeus	<i>Potentilla strigosa</i> Pall.		
346	ROSACEAE	<i>Potentilla rivalis</i> Nuttall	<i>Potentilla rivalis</i> Nutt.	1909	NMC
347	ROSACEAE	<i>Potentilla rivalis</i> Nuttall	<i>Potentilla rivalis</i> Nutt.	1909	NMC
36	ROSACEAE	<i>Prunus virginiana</i> Linnaeus var. <i>melanocarpa</i> (A. Nelson) Sargent	<i>Padus melanocarpa</i> (A. Nels.) Shafer		
69	ROSACEAE	<i>Rosa woodsii</i> Lindley var. <i>woodsii</i>	<i>Rosa fendleri</i> Crep.		
102	ROSACEAE	<i>Rubus idaeus</i> Linnaeus subsp. <i>strigosus</i> (Michaux) Focke	<i>Rubus strigosus</i> Michaux	1909	NMC
229	ROSACEAE	<i>Rubus parviflorus</i> Nuttall	<i>Rubus parviflorus</i> (Nutt.) Rydb.	1909	NMC
74	RUBIACEAE	<i>Galium boreale</i> Linnaeus	<i>Galium boreale</i> L.		
362	RUBIACEAE	<i>Galium fendleri</i> Gray	<i>Galium fendleri</i> Gray		
189	RUBIACEAE	<i>Galium triflorum</i> Michaux	<i>Galium triflorum</i> Michx		
277	RUBIACEAE	<i>Houstonia rubra</i> Cavanilles	<i>Houstonia rubra</i> Cav.		
59	RUTACEAE	<i>Ptelea trifoliata</i> Linnaeus	<i>Ptelea mollis</i> Curt.		
302	SALICACEAE	<i>Salix</i>	<i>Salix</i>		
253	SALICACEAE	<i>Salix bebbiana</i> Sargent	<i>Salix bebbiana</i> Sarg.		
351	SALICACEAE	<i>Salix exigua</i> Nuttall subsp. <i>exigua</i>	<i>Salix exigua</i> Nutt.		
202	SALICACEAE	<i>Salix irrorata</i> Andersson	<i>Salix irrorata</i> Anderss.		
20	SANTALACEAE	<i>Comandra umbellata</i> (Linnaeus) Nuttall subsp. <i>pallida</i>	<i>Comandra pallida</i> A. DC.		
51	SAXIFRAGACEAE	<i>Heuchera parvifolia</i> Nuttall ex Torrey & Gray	<i>Heuchera parvifolia</i> Nutt.		
134	SAXIFRAGACEAE	<i>Heuchera puchella</i> Wootton & Standley	<i>Heuchera pulchella</i> Wootton & Standley		
63	SCROPHULARIACEAE	<i>Castilleja integra</i> Gray	<i>Castilleja integra</i> Gray		
349.1	SCROPHULARIACEAE	<i>Castilleja linariaefolia</i> Benth	<i>Castilleja lineariaefolia</i> Benth.		
349	SCROPHULARIACEAE	<i>Castilleja miniata</i> Douglas ex Hooker	<i>Castilleja confusa</i> Greene		
383	SCROPHULARIACEAE	<i>Cordylanthus wrightii</i> Gray	<i>Adenostegia wrightii</i> (Gray) Greene		
450	SCROPHULARIACEAE	<i>Maurandya antirrhiniflora</i> Humboldt & Bonpland ex Willdenow	<i>Maurandya antirrhiniflora</i> (Poir.) Willd.		
294	SCROPHULARIACEAE	<i>Mimulus glabratus</i> (HBK) var. <i>jamesii</i> (Torrey & Gray ex Benth)	<i>Mimulus glabratus</i>		MO
425	SCROPHULARIACEAE	<i>Mimulus guttatus</i> A.P. deCandolle	<i>Mimulus langsdorffii</i> Don		
222	SCROPHULARIACEAE	<i>Orthocarpus luteus</i> Nuttall	<i>Orthocarpus luteus</i> Nutt.		
378	SCROPHULARIACEAE	<i>Orthocarpus purpureo-albus</i> Gray ex S. Watson	<i>Orthocarpus purpureo-albus</i> Gray		
10	SCROPHULARIACEAE	<i>Pedicularis centranthera</i> Gray	<i>Pedicularis centranthera</i> Torr.		
151	SCROPHULARIACEAE	<i>Pedicularis procera</i> Gray	<i>Pedicularis grayi</i> A. Nels.	1909	NMC
105	SCROPHULARIACEAE	<i>Penstemon barbatus</i> (Cavanilles) Roth subsp. <i>torreyi</i> (Benth) Keck	<i>Penstemon torreyi</i> Benth.	1914	NY, NMC
43	SCROPHULARIACEAE	<i>Penstemon inflatus</i> Crosswhite	<i>Penstemon gracilis</i> Nutt.?	1914	NY
480	SCROPHULARIACEAE	<i>Penstemon jamesii</i> Benth		1914	NY
374	SCROPHULARIACEAE	<i>Penstemon ophianthus</i> Pennell	<i>Penstemon similis</i> A. Nels.?	1914	NY
240	SCROPHULARIACEAE	<i>Penstemon secundiflorus</i> Benth. ex A. DC.	<i>Penstemon fendleri</i> Gray?	1914	NY
262	SCROPHULARIACEAE	<i>Penstemon secundiflorus</i> Benth	<i>Penstemon unilateralis</i> Rydb.		
123	SCROPHULARIACEAE	<i>Penstemon strictus</i> Benth subsp. <i>strictiformis</i> (Rydberg) DD Keck	<i>Penstemon strictiformis</i> Rydb.	1914	NY
103	SCROPHULARIACEAE	<i>Penstemon whippleanus</i> Gray	<i>Penstemon whippleanus</i> Gray	1914	NY

138	SCROPHULARIACEAE	<i>Veronica americana</i> Schweinitz ex Benth	<i>Veronica americana</i> Schwein.		
252	SCROPHULARIACEAE	<i>Veronica peregrina</i> Linnaeus var. <i>xalapensis</i> (Humboldt, Bonpland, & Kunth) Pennell	<i>Veronica xalapensis</i> HBK.		
239	SOLANACEAE	<i>Datura innoxia</i> P. Miller	<i>Datura meteloides</i> DC.		
295	SOLANACEAE	<i>Lycium</i>	<i>Lycium</i>		
469	SOLANACEAE	<i>Lycium pallidum</i> Miers	<i>Lycium pallidum</i> Miers.		
287	SOLANACEAE	<i>Physalis hederifolia</i> Gray	<i>Physalis hederifolia</i> Gray		
393	SOLANACEAE	<i>Physalis longifolia</i> Nuttall var. <i>longifolia</i>	<i>Physalis longifolia</i> Nutt.		
197	SOLANACEAE	<i>Solanum elaeagnifolium</i> Cavanilles	<i>Solanum elaeagnifolium</i> Cav.	1914	NY
466	SOLANACEAE	<i>Solanum heterodoxum</i> Dunal var. <i>novomexicanum</i> Bartlett	<i>Androcera novomexicana</i> (Bartl.) Wooton & Standley		
68	SOLANACEAE	<i>Solanum jamesii</i> Torrey	<i>Solanum jamesii</i> Torr.		
381	SOLANACEAE	<i>Solanum nigrum</i> Linnaeus	<i>Solanum interius</i> Rydb.	1914	NY
251	SOLANACEAE	<i>Solanum triflorum</i> Nuttall	<i>Solanum triflorum</i> Nutt	1914	NY
403	ULMACEAE	<i>Celtis reticulata</i> Torrey	<i>Celtis reticulata</i>		
247	URTICACEAE	<i>Urtica dioica</i> Linnaeus subsp. <i>gracilis</i> (Aiton) Selander	<i>Urtica gracilis</i> Ait ?	1909	NMC
2	VALERIANACEAE	<i>Valeriana arizonica</i> Gray	<i>Valeriana ovata</i> Rydb.		
329	VALERIANACEAE	<i>Valeriana edulis</i> Nutt. ex Torrey & A. Gray		1914	MO
313	VALERIANACEAE	<i>Valeriana edulis</i> Nuttall	<i>Valeriana trachycarpa</i> Rydb.		
17	VERBENACEAE	<i>Glandularia bipinnatifida</i> (Nuttall) Nuttall var. <i>ciliata</i> (Benth) Turner	<i>Verbena wrightii</i> Gray	1909	NMC
221	VERBENACEAE	<i>Verbena bracteata</i> Lagasca & Rodriguez	<i>Verbena bracteosa</i> Michx.	1909	NMC
258	VERBENACEAE	<i>Verbena macdougalii</i> Heller	<i>Verbena macdougalii</i> Heller	1909	NMC
446	VIOLACEAE	<i>Hybanthus verticillatus</i> (Ortega) Baillon	<i>Ionidium verticillatum</i> (Ort.)		
426	VIOLACEAE	<i>Viola</i>	<i>Viola</i>		
23	VIOLACEAE	<i>Viola canadensis</i> L.	<i>Viola canadensis</i> L.		
122	VITACEAE	<i>Parthenocissus vitacea</i> (Kner) A. S. Hitchcock	<i>Parthenocissus hederacea</i> (Kner)	1909	NMC
115	VITACEAE	<i>Vitis arizonica</i> Engelm.	<i>Vitis arizonica</i> Engelm.		
309	ZYGOPHYLLACEAE	<i>Kallstroemia</i>	<i>Kallstroemia</i>		

Appendix 1: Excerpts from the 1893 University of New Mexico Catalogue published in spring 1892



Board of Regents.
HIS EXCELLENCY, W. T. THORNTON, Governor of the Territory, <i>Ex-officio</i> .
HON. AMADO CHAVES, Superintendent Public Instruction, <i>Ex-officio</i> .
HON. HENRY L. WALDO, Term expires 1893.
HON. MARIANO S. OTERO, Term expires 1894.
HON. E. S. STOVER, Term expires 1895.
MR. FRANK W. CLANCY, Term expires 1896.
HON. G. W. MEYLERT, Term expires 1897.
Officers.
HON. MARIANO S. OTERO, <i>President</i> .
HON. G. W. MEYLERT, <i>Secretary and Treasurer</i> .

Faculty
ELIAS S. STOVER, <i>President.</i>
GEORGE S. RAMSAY, M. A., <i>Principal of the Normal and Preparatory Departments, Professor of Mathematics and Civics.</i>
ALCINDA L. MORROW, M. A., <i>Assistant-Principal of Normal Department, Professor of Education and Spanish.</i>
MARSHALL R. GAINES, M. A., <i>Professor of Latin, Greek, and Natural Sciences.</i>
MARTHA L. TAYLOR, B. A., <i>English, Grammar, History, and Geography.</i>
HARRIET E. JENNESS, <i>Drawing, Delsarte, Penmanship, and Music.</i>
ANDREW GROH, <i>German and French.</i>
M. CUSTERS, <i>Custodian.</i>

Outline of Normal Course of Study.
PREPARATORY.
<i>Fall Term</i> —Arithmetic, (Mental), English Grammar, Descriptive Geography, Reading and Spelling, Penmanship.
<i>Winter Term</i> —Arithmetic, English Grammar, Descriptive Geography, Reading and Spelling, Penmanship.
<i>Spring Term</i> —Arithmetic, English Grammar, U. S. History, Reading and Spelling, Penmanship.
English Composition 2 hours a week the whole year.
FRESHMAN.
<i>Fall Term</i> —Arithmetic, (Higher), Rhetoric, Physiology, General History, Drawing.
<i>Winter Term</i> —Algebra, Rhetoric, Zoology, General History, Drawing.
<i>Spring Term</i> —Algebra, Rhetoric, Physical Geography, General History, Drawing.
American Literature 3 hours a week the whole year, with Essays; also Herbert Spencer's Philosophy of style.
SOPHOMORE.
<i>Fall Term</i> —Algebra, General History, English Literature, Spanish, Delsarte.
<i>Winter Term</i> —Algebra, General History, English Literature, Spanish, Delsarte.
<i>Spring Term</i> —Algebra, Chemistry, English Literature, Spanish, Delsarte.

Four essays, two orations, and three written discussions, with rhetorical criticism.

JUNIOR.

Fall Term—Geometry, Psychology and School Management, Spanish, Bookkeeping, Music.

Winter Term—Geometry, Civil Government, Spanish, Ethics, Music.

Spring Term—Botany, Methods of Teaching, Spanish, Geology, Music.

Comparative critical study of English authors with work in advanced Rhetoric.

SENIOR.

Fall Term—Physics, History of Education, Spanish, Elocution, and Delsarte.

Winter Term—Physics, Philosophy of Education, Spanish, Elocution and Delsarte.

Spring Term—School Economy, Practice Teaching, Spanish, Music and Delsarte.

Historical English Grammar. Three themes for the year.

Students.

PREPARATORY COURSES.

CLASSICAL—SENIOR YEAR.

Gaines, Morrell W. Albuquerque

SENIOR MIDDLE YEAR.

Gaines, Ruth. Albuquerque

PHILOSOPHICAL.

SENIOR MIDDLE YEAR.

Alger, Mabel. Albuquerque

Whiteman, Mildred. "

Wright, Lydia. "

Kempenich, Henry. Peralta

Marshall, Fred. D. Albuquerque

JUNIOR MIDDLE YEAR.

Bell, Hassie. Albuquerque

Leekley, Gertrude. "

Jenkins, Ellen. "

Newton, Grace A. "

Stagg, Nellie. "

Walton, Stella. "

Frost, Alfred. Cerrillos

Griswold, Walter. Albuquerque

Spencer, Arthur. "

Thompson, Harry. "

NORMAL COURSE.

JUNIOR YEAR.

Adams, Kate. Albuquerque

Buchanan, Bessie. "

Harum, Joste. "

James, Mary L. "

Kendrick, Elizabeth. "

Large, Eva. Springfield, Mo.

Whiteman, Pauline. Albuquerque

Mathes, Fred. A. "

Jenkins, Clarence. "

Towne, Frank J. Tucson, Ariz.

SOPHOMORE YEAR.

Armstrong, Cora. Albuquerque

Bell, Margaret. "

Bliss, Inez. "

Jenks, Ruth Mary. "

Keeper, Lily. "

Lee, Margaret. "

Miller, Edna C. "

Gibbons, Florence. Reliance, Ariz.

Geigoldt, Harry. Albuquerque

FRESHMAN YEAR.

Craig, Sammie. Albuquerque

Custers, Janette. "

Ellis, Charlotte C. "

Ellis, Maude. "

Jenks, Marguerite M. L. "

Johnson, Maggie. Santa Fe

Mellvain, Fannie. Albuquerque

Sierry, Nora J. "

Sanchez, Carlos. Atrisco

Sanchez, G. "

Smith, Thomas. Albuquerque

Smith, Hugh. "

Whiteman, Fred. "

Zurita, Antonio. "

SELECTED STUDIES.

Goh, Mrs. Lindie. Albuquerque

K. "

Knight, M. J. St. Paul, Minn.

McCartrell, Mrs. E. H. Normal, Ill.

Rumney, Mrs. Etta A. Albuquerque

Ellis, Guy. "

Goh, Andrew. "

Kempenich, Eugene. Peralta

Kempenich, Paul. "

Ritchie, S. B. Albuquerque

Rose, Nathan J. "

Vaile, H. F. Denver, Colo.

Van Antwerp, A. L. Albuquerque

PRACTICE CLASS.

Beshore, Mary. Marion, Ind.

Custers, Ruby. Albuquerque

Davis, Louise. "

Ridley, Lizzie. "

Rumford, Mabel. "

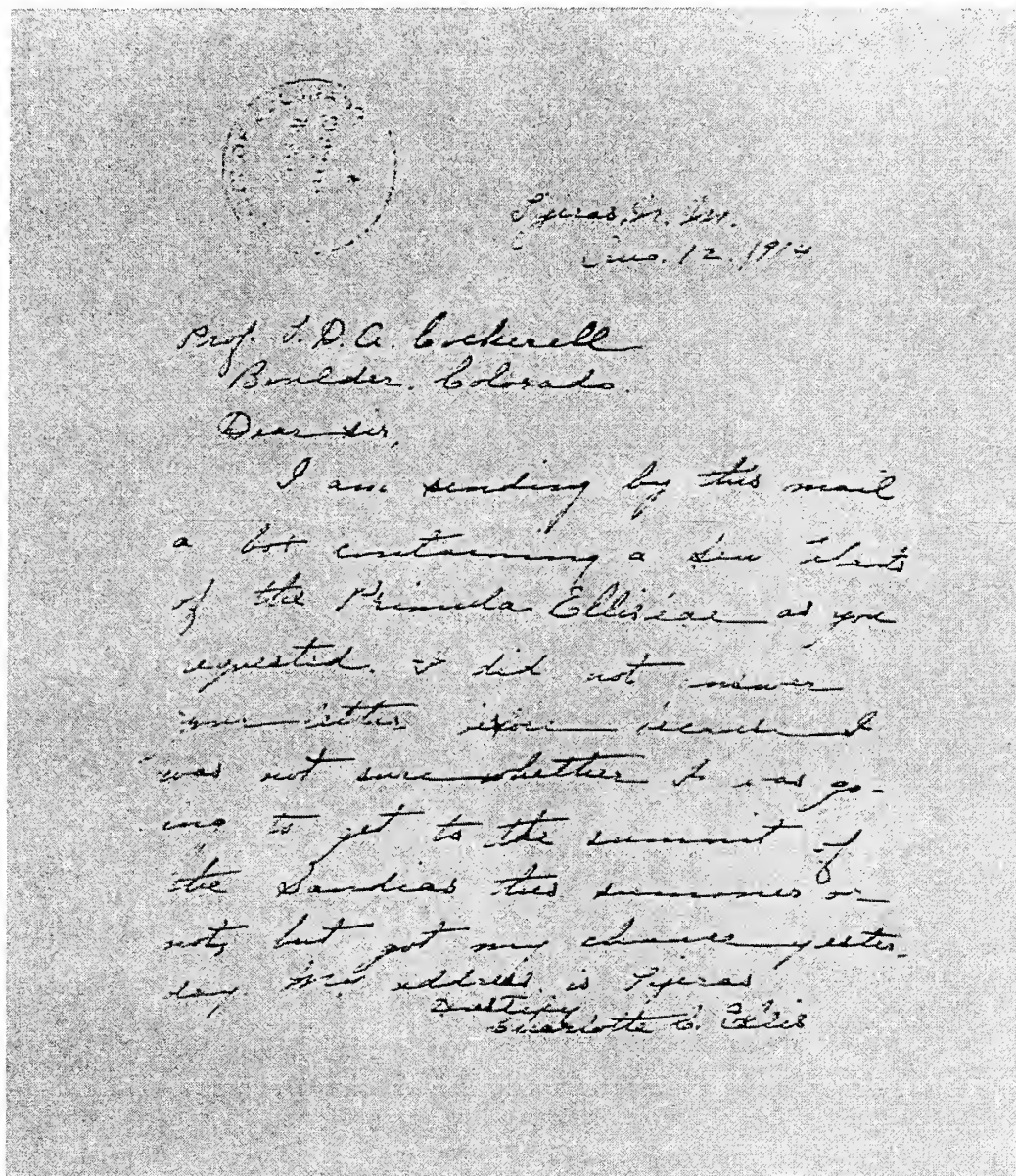
Rumford, Ida. "

Harms, Eddie. "

Davis, Benjamin. "

Donciana, John. "

Green, Ralph R. "



Tijeras N M
Aug. 12, 1914

Prof. T. D. A. Cockerell
Boulder, Colorado

Dear sir,

I am sending by this mail a box containing a few plants of the *Primula Ellisiae* as you requested. I did not answer your letter before because I was not sure whether I was going to get to the summit of the Sandias this summer or not, but got my chance yesterday. My address is Tijeras.

Hastily,
Charlotte C. Ellis

522 S. Edw. St. College, N.Y.

Sept. 8, 1914
UNIVERSITY OF CALIFORNIA

Professor J. D. A. Cockrell
Boulder, Colorado.

Dear sir,

I am glad the primroses reached you in good condition. I shall be very much interested to hear how they do. I may have told you that I am experimenting some with it, and other high altitude plants, myself. I have it started in three different places - Cedro Ranger Station, San Francisco and Berkeley. I am always in-

terested in cultivating the wild

flowers - we had many varieties at our ranch in the Sandias. The yellow columbine *Aquilegia* the chrysanthemum that I brought from Ariz. was one of the most satisfactory. I never saw it grow so ramp and bl. so profusely any where else and it blossomed from June until ^{cut down} killed by the hard frosts. The beautiful yellow *fulgens* from the summit did very well under cultivation but I notice that it died out after we left as most of the other varieties from the top did. If I am around this part of the country ^{with summer} I would like to exchange seeds with you. We have the crimson *potentilla* and the composite you speak of. I wonder the latter the same we saw above the head of the River in June - one year ago. It is most certainly worth cultivating. I took some roots to our summit and, but something happened to them all one after another. They grew in logs where we saw them - I'd do anything most, if I could afford it, to get it introduced.

Yours truly

interested in cultivating the wild flowers - we had many varieties at our ranch in the Sandias. The yellow columbine *Aquilegia* the chrysanthemum that I brought from Ariz. was one of the most satisfactory. I never saw it grow so ramp and bl. so profusely any where else and it blossomed from June until ^{cut down} killed by the hard frosts.

The beautiful yellow *fulgens* from the summit did very well under cultivation but I notice that it died out after we left as most of the

other varieties from the top did. If I am around this part of the country ^{with summer} I would like to exchange seeds with you. We have the crimson *potentilla* and the composite you speak of. I wonder the latter the same we saw above the head of the River in June - one year ago. It is most certainly worth cultivating. I took some roots to our summit and, but something happened to them all one after another. They grew in logs where we saw them - I'd do anything most, if I could afford it, to get it introduced.

Remember me kindly to your wife, whom I remember very well.

Yours truly

Charlotte C. Ellis
I shall be very glad when that

It is published

522 S. Edith St., Albuquerque, N.M.
Sept. 8, 1914

Professor T. D. A. Cockerell
Boulder, Colorado

Dear sir,

I am glad the primroses reached you in good condition. I shall be very much interested to hear how they do. I may have told you that I am experimenting some with it, and other high altitude plants, myself. I have it started in three different places – Cedro Ranger Station, San Francisco and Berkeley. I am always interested in cultivating the wild flowers – we had many varieties at our ranch in the Sandias. The yellow columbine *Aquilegia chrysantha* that I brought from Arizona was one of the most satisfactory. I never saw it grow so rank and bloom so profusely anywhere else and it blossomed from June until cut down by the hard frosts.

The beautiful yellow *polemonium* from the summit did very well under cultivation but I notice that it died out after we left as most of the other varieties from the top did. If I am around this part of the country next summer, I would like to exchange seeds with you. We haven't the crimson *potentilla* nor the composite you speak of. I wonder if the latter is the same we saw above the head of the Pecos in June one year. If so it is most certainly worth cultivating. I took some roots to our mountains, but something happened to them all one after another. They grew in bogs where we saw them. I'd do anything most, if I could afford it, to get it introduced.

No, there is no expense this time, in getting the primroses. We were going up anyway. Mrs. Mordie, who was one of the party, and who says she knows you, even paid the postage. But now suppose I was getting them for strangers, or suppose I was growing them in my own garden and wanted to sell them, could you give me some idea of what I ought to charge? The summit of the mountains is four miles from the ranch.

Remember me kindly to your wife, whom I remember very well.

Yours truly
Charlotte C. Ellis

I shall be very glad when that botany is published.

Springerville, Arizona
July 9, 1915

Professor T. D. A. Cockerell,
Boulder, Colorado.

My dear sir,

Your postal of April 27th was forwarded to me here from the New Mexico State College, and I hasten to tell you that I was very much pleased to hear that *Primula ellisiae* was in flower. I shall be very much interested in hearing how it turns out after being crossed with *Primula auricula*. Are you contemplating a trip to the San Francisco Exposition?

I have now told you that I sent *Primula* roots to a lady in San Francisco and in Berkeley to try, and I might give you instructions to them if you are interested. I asked them both to let me know how the plants were doing. Having heard nothing, it is possible the plants may have died.

I'd hoped to send you some different plants from the Sandias this summer, but was not there long enough to locate them. This summer I am in the White Mountains, on the Little Colorado six miles from Springerville.

Springerville Arizona
July 9, 1915

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Boulder, Colorado

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Yours truly
Charlotte C. Ellis



3925 Umatilla St.
Denver, Colorado.
Sept. 18, 1936.

Prof. T. D. A. Cockerell
Boulder, Colorado.

Dear Professor Cockerell

I am gathering some Colorado data for youngsters. I want an accurate life-zone list and so I come to you. I have two lists but they are not just alike and neither of them yours.

Will you please tell me the number of Colorado flowers to date. I have an item from "Municipal Facts", 1930, putting the number at 2,989 classified varieties - 385 from timberline up and 500 in the plains - but there must be a larger number now.

This has nothing to do with Colorado, but will you please tell me how I can procure some copies of your leaflet, "A Visit With Grey Owl." I have one

(I took it away from my sister) but I want some more. We were perfectly enthralled with your story and pictures.
Remember me kindly to Mrs. Cockerell

Yours most sincerely,
Charlotte C. Ellis

3925 Umatilla St.
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Yours most sincerely,
Charlotte C. Ellis

COOPERATIVE EXTENSION WORK IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEW MEXICO

NEW MEXICO COLLEGE OF AGRICULTURE
AND MECHANIC ARTS, UNITED STATES
DEPARTMENT OF AGRICULTURE AND
COUNTIES COOPERATING

EXTENSION SERVICE

STATE COLLEGE, NEW MEXICO

February 25, 1930.

Mr. C. C. Ellis,
808 E. 18th. Avenue,
Denver, Colorado.

Dear Sir:

Your letter of February 21 in regard to Governmental activities in the eradication of loco has been received. The Government has done a great deal of work in an effort to find some suitable means of eradicating this plant and are at present experimenting with several insects which feed upon the plants and lay their eggs in the seed pods. Up to the present the results have not been especially encouraging.

There are no statistics regarding the amount of damage done by the plant in 1929.

The best method of ridding a pasture of loco is to simply grub it out. This is a rather large undertaking as it must be grubbed each year for four or five consecutive years. If the loco is in patches it may be eradicated by spraying with a solution of Calcium Chlorate, 1 pound to each gallon of water. The best time to do this spraying is when the plants are in flower.

Yours truly,

EXTENSION SERVICE

By *W. L. Black.*

W. L. Black,
Extension Animal Husbandman.

WLB:RHR

252 Lincoln Street

Denver 9, Colorado

April 10, 1954

Mr. William MacLeod Raine

Dear Mr. Raine:

I thank you for consenting to autograph your book, Famous Sheriffs and Western Outlaws for my nephew, Jon Keller. I would have sent the book immediately, but was not able to get to the postoffice, after phoning you.

The book belonged to Mr. James Carruthers and had been stored since his death in 1939. He was ninety three when he died. Jim lived in Tombstone in the days you depict in the Hellsdorado chapter. He had a butcher shop, also some prospect holes. He was a Scotchman and seemed very well liked, though he never drank or gambled with the other men. "Because it cost too much and I was saving to send for Jean." Jean was the girl he left behind.

When I was a small girl we (the Ellis family) lived at Federnal Peak for four years. The Carruthers at the time had a butcher shop in San Pedro, New Mexico (and some mines, of course) and Jim used to take the long trip down to Monteceno (?) to buy beef cattle of Jesse (?) Pera. Pera owned the Turkey Trsek brand. The brand which spread from the animal's shoulder to its flank.

Jim knew many of the people we knew--the Bergers and some of their relatives, the Spence brothers at Pecos Well, people at Antelope Springs, Estancia, Stinking Springs and so on--and yet, since Jim took the route that passed on the other side of Federnal, we

did not meet until several years later, when we were living in Albuquerque and they were still in San Pedro. Then our families became life-long friends.

I read your Famous Sheriffs along with some others of your books, Tomlin, since his eyes were failing, after he came to Denver. He had many comments as I read and my niece took down his remarks and later we scribbled them in the margins of the book.

Jim spoke many times of the authenticity of the book and thought you must have lived in Tombstone at the time, but could not remember you. He remarked that you never mentioned special horses that some of your heroes rode. I told him that it would have made the book too bulky.

Pa (Ellis') knew Pat Garrett very well. He would stay all night with us when he was on his way from White Oaks to Las Vegas, or wherever he was bound from or to. To little as he seemed very refined. He dressed better than most of the men of the plains and was very soft-spoken and well-spoken. He and my father liked to talk antelope hunting. Once Mr. Garrett brought his Spanish-Jessie wife and baby, Elizabeth. The baby was blind. Later, I believe, Elizabeth became a singer.

I'd better stop now before I go on and on. Even so, I see by the clock that I am not going to get your book mailed until Monday.

Yours sincerely,

(Miss) Charlotte L. Ellis

Balsam Park
Sandia Park, N. M.
June 26, 1929

Dear Uncle George:

I must right down and tell you all about the trip I have just had. Paul and I had to go and look for a calf. That does not sound as if there could be much to write about, does it? But wait--

Paul thought we would probably find the calf somewhere around Madera, which is about four miles from here, so accordingly after we had our chores all done we set off. It was still cool and I did so enjoy the trip across the mountains. The horses felt frisky and full of mischief, the birds were rustling in the bushes and singing in the trees, Vesta kept jumping little cotton-tails, and Pat, the colt, ran now ahead now behind, shying at everything he could find to shy at.

It was dry and not in Madera, however; but then it always has been dry and always will be, I suppose. The springs are so low it takes six days to fill the reservoir. The principal topics of conversation among the Madera Mexicans is the dryness and the water question. "Muy poco agua." "Muy seco." "Mal negocio." --How little rain there was, how very dry it was, when it rained last; how they heard it had rained in Algodones or some other place many miles away; how it had looked like rain one day last month. Garcia told us it rained two whole days about four years ago.

We rode up to Garcia's house and asked him if he had seen our calf. He said he had not but invited us in and said he would ask some of the other Mexicans around there. We hated to take the time to go in but Garcia was so insistent, and so eager to have us see his little home and meet his family we could not refuse without offending him. We told him we would come in for a minute, but the minute lengthened into an hour or more, for before we knew what she was up to Mrs. Garcia was busily getting dinner for us. "Don't forget that we have been invited to the ranger's camp for dinner," I whispered Paul.

"I know, but I can't help it," he said.

Senora Garcia was a very fat woman, but rather pretty --not as dark as most of the Mexicans. She wore a tan organdy dress, trimmed with long sweeps of wavy braid and tinsel, the latter from some Christmas tree, no doubt. When she prepared the meal, Daniel and Paul discussed the weather conditions.

and stock and I looked around. There was an iron bed in the room which looked as if it had never been used, and two pallets on the floor, which looked very much used. There was a table in the corner on which were a few knic-knacs--a few photographs in frames, a box of face powder and a gaudy bottle. On the walls, among many cheap pictures of saints and madonnas were some of the oddest decorations I ever saw. There was a small case, for one thing, something like a specimen case with graded shelves, and on these shelves were--guess! You couldn't ever--cheap, bright-colored candy. QQ the front had been fastened pink mosquito netting. Across from that was a square of fancy calico in a frame, and over that a magazine picture. But the strangest decoration of all was a scalp lock of golden hair. I never in my life saw more beautiful hair. I wonder where it came from. It had two fancy back combs stuck in it one above the other. There were a great many home made rugs on the floor. The floor was adobe and was in splendid condition. Everything was very clean and tidy. Paul asked Garcia if they slept on the floor and he said no they kept that for looks, none of them liked to sleep in a bed.

There were two cute little children playing on one of the pallets, one a tiny girl of about three and a boy a little older. Many other children drifted in while we sat there. One a small boy wearing a pair of black velvet pants, a little girl in a pink gingham dress, trimmed with quantities of cheap lace, and wearing a white pique bonnet. Then there was a little girl in a red silk dress. The Mader Mexicans are very poor, indeed, often not able to buy coffee or sugar, and I often wonder where they get such nice clothes for the women and children to dress up in. Perhaps the "best clothes" are handed down from generation, and only used on very state occasions, such as this, for instance. This was evidently a dress review parade.

We went over to see Filipita Baros Trujillo Guterrez, and her little Carlota, who was named for me. Filipita had evidently heard we were coming for she was dressed up, too, in a white silk dress trimmed in colored wools. She had a nice little mud house, and it was as clean as two hands could make it. I must describe her floor covering, for she had innumerable rugs. One was quite a large one. The foundation was canvas, and had figures cut from many kinds of material and appliqued on--scraps of Navejo blanket, brussels carpet, corduroy, velvet, velveteen. Another rug was made of circles, in layers, each layer smaller than the one below it. It reminded one of a huge penwiper. It was pretty but I'd want it where no one would stumble over it.

Carlota was a winsome little girl with the tightest of little pig-tails over each ear, and the brightest of orange dresses on her little self. A kitten appeared in the doorway as we sat there--the blackest and thinnest kitten I believe I ever saw. An unforgettable cat. Its hair was wiry and stuck out all over, making it look exactly like our smallest separator brush.

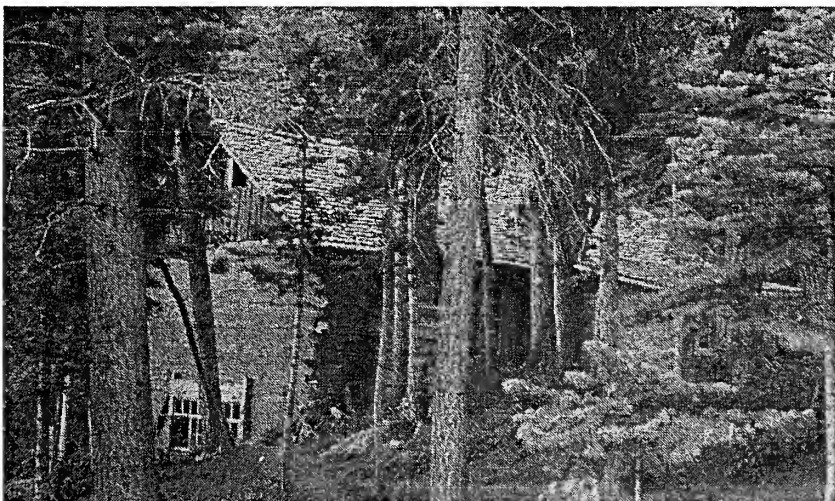
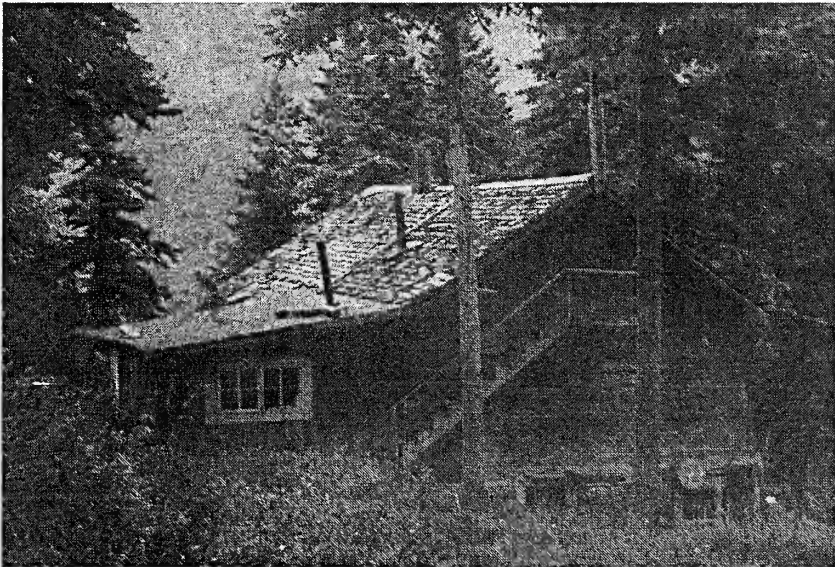
A pair of swallows had a nestful of youngsters directly over my head. They noticed right away that there were strangers in the house, and would feed their babies no more while we were there, but sat on picture frames and watched our every movement. One sat on the frame of a very good print of Sichel's Madonna, which was very well framed.

The Garcias gave us quite a spread. Goat meat, eggs, hot cakes, goat cheese, coffee. I couldn't eat very much, for the meat was tough, the were made of flour and water only, and the cheese had been an axle grease box.



Appendix 4: Photographs, notebook entries, and selected poems

Balsam Park LS Ranch house





Julia, Paul, George

Charlotte



Charlotte and sweetpeas



Charlotte and Julia



Paul and Charlotte



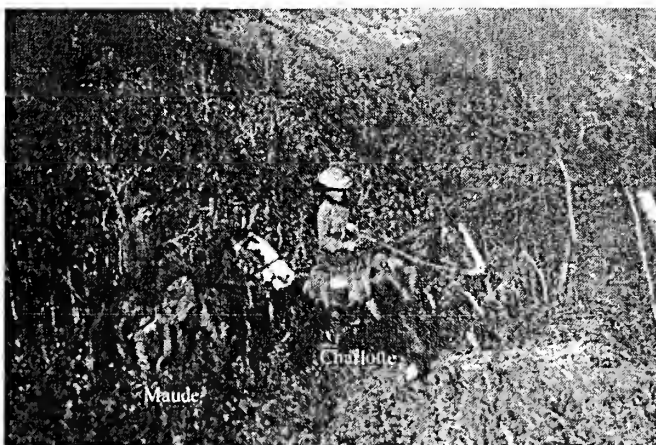
Charlotte and tray



First woman to ski in the Sandias



Charlotte rural delivery on Tom six miles from home



"Metlesome steed of mine merrily prancing
Satin smooth skin ashine, black eyes adancing"



Augie and Frank

13 July
 On the Plane - 46 33 607
 August 12, 1941 9:00 a.m.
 9:30 Out over the water, over the hays. It is
 a cloudy day. From Miami we could hear
 the and see a settled sky. From here
 10,000 feet up, the clouds to the left look
 like huge tufts of cotton pulled from their
 holes. The objects to be standing upright - one
 and ice - blue ruffling ice - camp. They are
 remarkably beautiful, ephemeral, unreal.
 There was sufficient shadow to make these
 clouds stand apart. "The night they hide
 and sleep among them," was just said.
 There are natural-looking clouds in the
 far distance, building clouds below. Waves
 look like frozen ripples. White caps like
 foam flecks of foam.
 9:45 passing little cakes and orange
 juice. Ahh! There's a rest. Easy to sit
 on our airplane. We are traveling so fast
 on here. It's close very good and feel as if
 we were at a standstill with water running
 over our heads. We are at a little. They are not
 like in water.

100
 Wed 13, 1941
 Started at 12:00 in the 46 55 609
 12:15 out over the water
 the clouds except in the distance seem as if
 we were at a standstill. Cars acting as if
 built like where car ends and they began
 slowly and cool
 12:25 The clouds in distance are
 now clear and look like huge tufts of
 smoke from a locomotive. Cars are open-
 ing and closing. Water ice-blue, ruffled
 long tufts of "cotton" all over it now. As we
 had soap, now made one
 12:35 Clouds below a little larger, stop
 the ruffled egg dotted here and there
 floating island. The soap up and down
 over so slightly. I can tell by the clouds alone
 just enough to give a pleasant sensation
 The soap (up and down motion of the painting
 the plane makes the water-bugs look as if they
 are leaping. Good the plane is going so
 gently steady. The nothing was pleasant
 12:45 Over many fluffy clouds and two
 so large and stand high as there we had

101 yesterday
1:00

Getting cooler. Some shuffling off in totes
has begun though with towels and wraps
jackets. Some sort to me complaints of cold feet.
Chest feels warmer when we have to wrap them in
the getting warm. See the keys. Every def-
erent color of water and islands. Bridges, land
colors - green, purple, orange, brown, etc. etc.
Orts of water, reefs, shoals, deep blue, water blue, green
and, suddenly yellow-green - line? Some reefs
look like sand. Water was deep blue to purple
streaked with green. Orange green waves.

We were had a crop of very hard. You were
very kind of head-gear you with, as we had your
about half the women are wearing slacks. As one
gets sick. And expected to I suppose the slacks,
nothing to wear under the paper sacks in the wrap
in front of each seat. No parasols, no life
preservers.

Many colors. Midnight blue, gray blue
streaked with green. Some grass looks like
a fountain of yellow streaked with color.
Tiny islands, yellow and green. Islands

102

edges with yellow as though a sand can all
around. White sides - yellow in distance.
Boiling clouds white. Perimeter of color.

More jiggly. Big jigg that time

Over mountain. Beautiful green land.

1:25. Steward says get us to station over salt.
Coming down swiftly. Steward says get us to keep
our seats until the captain has gone through.
We sit in suspension - rather the better slow in
front. The door opens. A tall handsome young
fellow in blue uniform steps out and waves
down the aisle. We leave.

The Keys.

Key Largo 2430 miles. Limestone and coral.
The keys extend in a sweeping curve to
Key West more than a hundred miles out
into the gulf. Key West consists of old coral
reef. The southern portion was at one time
a single limestone formation.

45

Hidden

*I have turned the key
On an old desire,
Left it in a room
Where there is no fire*

*Left it all alone,
Windowless and damp —
A very old desire —
Without food or lamp.*

*Surely it has died
In so dull a place,
Died as does a stem
In a shallow vase.*

*Yet I may not rest
For the ceaseless call
Coming from a thing
Hid behind a wall.*

Hidden

I have turned the key
On an old desire
Left it in a room
Where there is no fire

Left it all alone
Windowless and damp
A very old desire
Without food or lamp.

Surely it has died
In so dull a place
Died as does a stem
In a shallow vase

Yet I may not rest
For the ceaseless call
Coming from a thing
Hid behind a wall.

Little Leaves

I love the little leaves
That duck and dance with spring,
Each newly varnished face
A challenge to despair;

I love the little leaves
Their measured murmuring
Each in its high-hung place
A laughing link of prayer

I love the little leaves
Content to sway and swing,
Like bits of bright green lace
Against the naked air.

Little Leaves

*I love the little leaves
That duck and dance with spring.
Each newly varnished face
A challenge to despair;*

*I love the little leaves
Their measured murmuring,
Each in its high-hung place
A laughing link of prayer;*

*I love the little leaves
Content to sway and swing,
Like bits of bright green lace
Against the naked air.*

The Magician

Life has such a subtle way
Of forming roses out of clay;
Of taking tears that seemed in vain
And making of them April rain;
Of getting from a heedless rafter
Echoes of dead bits of laughter;
Of welding in a sunset sea
Lost loveliness and imagery;
Of making out of crawling things
Butterflies with airy wings.
Life has such a subtle way
Of turning darkness into day.
Of bringing music, ocean old
To newness of a tale untold;
And then, grown jealous of its trust
Of changing roses back to dust.

The Magician
Life has such a subtle way
Of forming roses out of clay;
Of taking tears that seemed in vain
And making of them April rain;
Of getting from a heedless rafter
Echoes of dead bits of laughter;
Of welding in a sunset sea
Lost loveliness and imagery;
Of making out of crawling things
Butterflies with airy wings.
Life has such a subtle way
Of turning darkness into day.
Of bringing music, ocean old,
To newness of a tale untold,
And then, grown jealous of its trust
Of changing roses back to dust.

Folly

The moon has made me weary
With its silver and its song.
Such ardor is an old thing
Is wrong, all wrong.
It should be limping silently
Across a leaden sky
Or grumbling at the cloud-hills
The wind piles high.
It should be teaching little moons
The proper way to shine
Instead of singing sonnets
To each adoring pine.

Folly

The moon has made me weary
With its silver and its song.
Such ardor in an old thing
Is wrong, all wrong.

It should be limping silently
Across a leaden sky
Or grumbling at the cloud-hills
The wind piles high

It should be teaching little moons
The proper way to shine
Instead of singing sonnets
To each adoring pine.

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Interviews and Personal Correspondence

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- Vermillion, Richard. Telephone interviews, February 17, 2007 & March 5, 2007; personal interview June 3, 2007.

On-line Resources

- Family histories. <http://www.familysearch.org>
- Virtual Herbarium MO. <http://mobot.org/W3T/search/vast.html>
- Virtual Herbarium NY. <http://sciweb.nybg.org/science2/hcol/allvasc/index.asp>
- Virtual Herbarium US. <http://acsmith.si.edu/emuwebotweb/pages/nmnh/bot/Query.php>

Other Resources

Herbaria and databases. NMC, NMCR, and UNM

Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Rob Strahan [P.O. Box 522, Mesilla, NM 88046]

Phemeranthus calycinus (Engelmann) Kiger (Portulacaceae, large-flowered flameflower): Roosevelt County: BLM North Bluit Prairie Chicken Area, about 12 miles due east of Milnesand, N33°38.663 W103°8.739, shin-oak sandy swales with little bluestem, 4061 ft, 8 June 2007, R. Strahan 1150 (NMCR). [This species was reported incidentally for New Mexico by Bogle (*Journal of the Arnold Arboretum* 50:566-598. 1969) and Kiger (*Flora of North America*, vol. 4:492. 2003), both without specimen citation or locality. This report gives the first published documented occurrence of this species in New Mexico.]

— Kelly Allred [Dept. Animal & Range Sciences, New Mexico State University, Las Cruces, NM 88003]

**Arabidopsis thaliana* (Linnaeus) Heynhold (Asteraceae, mouse-ear cress): Eddy County: Artesia, Sun Country Garden Center, 2707 South 1st Street, N32°48.926 W104°23.710, rampant weed in the greenhouses, 3380 ft, 15 Dec 2007, plant sent in by county agent (NMCR). [Apparent first report for NM of this widespread, weedy annual from Eurasia. I have also observed it in flower beds in Las Cruces. One would expect this plant elsewhere, in moist, shady, weedy ground.]



Corrigenda

Gene Jercinovic has made some minor corrections to his article on New Mexico *Chamaesyce*, in issue 40. You may contact him directly for information: gjercinovic@earthlink.net

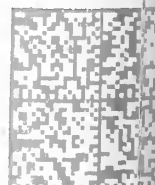
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William R. Buck
Institute of Systematic Botany
New York Botanical Garden
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A Newsletter for the flora of New Mexico, from the Range Science Herbarium and Cooperative Extension Service, College of Agriculture and Home Economics, New Mexico State University.

In This Issue —

- *Yucca* in New Mexico 1
- Keeping a field journal 5
- Botanical Literature of Interest 7
- Plant Reports 7
- Diaereses 8

Some Observations on the Dry, Dehiscent-fruited Yuccas in New Mexico

Robert Sivinski

New Mexico Forestry Division, P.O. Box 1948, Santa Fe, NM 87504

The relatively wet winter and spring months of 2007 produced a magnificent early summer display of *Yucca* flowers that inspired me to look more closely at this genus than I have ever done before during my travels throughout the State of New Mexico. After reviewing the literature and viewing many New Mexico *Yucca* populations and herbarium specimens, I find the taxonomic circumscriptions and geographic distributions of dry, dehiscent-fruited species in the section *Chaenacarpa* are still poorly understood and often misapplied in New Mexico¹. Unfortunately, most herbarium specimens are inadequate for the study of the dry, dehiscent-fruited yuccas. What are needed are regional population surveys and very broad circumscriptions of taxa that tolerate variability within regions and populations. The following observations and opinions may be helpful as New Mexican botanists grope towards consensus on this difficult and variable group of plants that represent (in part) our official state flower.

All of our dry, dehiscent-fruited yuccas have narrow leaves with smooth, filiferous margins separating into thread-like fibers. Leaf width and shape are consistently useful characteristics for distinguishing only two taxa from the larger group of New Mexican taxa. The leaves of both *Yucca neomexicana* Wootton & Standley and *Yucca harrimaniae* Trelease are narrowly lanceolate, relatively wide (1-2 cm), and are obviously concave on the upper surface and correspondingly convex on the lower surface (concavo-convex). The remaining New Mexican species of dehiscent-fruited yuccas have narrower leaves that are linear or linear-lanceolate, and are not, or less obviously, concave on upper surface though still markedly convex on the lower surface (plano-convex) especially near the middle of the leaf.

Yucca neomexicana is a distinctive endemic to rocky hills and escarpments in Union, Harding, eastern Colfax, eastern Mora, and northern San Miguel counties. It is an acaulescent, relatively broad-leaved yucca with a tall, racemose inflorescence that begins just above, or well beyond, the leaf tips. Occasional plants have short branches at the proximal nodes of the inflorescence and these are more frequent in the southern part of its range. Likewise, the purple color suffusing the outer surface of the outer tepals is darker and more obvious in the south than in the north of its range. *Yucca neomexicana* is sympatric with *Yucca glauca* Nuttall, but I have not seen any apparent hybrids between these species.

Yucca harrimaniae is very rare in New Mexico and I am not personally familiar with it in the field. I have seen only two UNM herbarium specimens of *Y. harrimaniae* from New Mexico with very wide (1.5 cm), leaf material and lacking flowers or inflorescence. A few collections have been made on sandstone bluffs to the north and northwest of Farmington in San Juan County (Ken Heil, personal communication) and southern McKinley County near Dalton Pass (Wagner 2054 UNM). Reveal (Cronquist et al. 1977) reduced *neomexicana* to a variety of the more variable *Y. harrimaniae*. Other recent authors (Clary 1997, Hess and Robbins 2002) maintain them as distinct, allopatric species that are geographically separated by the southern Rocky Mountains. *Yucca neomexicana* is apparently distinguished from *Y. harrimaniae* only by its longer scapes, but I have not seen the range of variation in *Y. harrimaniae* populations north and west of New Mexico, so have no opinion on this ranking. Jennings (San Juan Basin Flora, in press) believes that all San Juan River basin collections of *Y. harrimaniae* are actually *Yucca baileyi* Wootton & Standley, which may not be accurate for the New Mexico part of the basin since the McKinley County leaf specimen at UNM is broad (15 mm), lanceolate, and especially suggestive of *Y. harrimaniae*.

The type of *Yucca baileyi* is from the Chuska Mountains near the Arizona border in northwestern New Mexico. McKelvey's subsequent type for *Yucca standleyi* McKelvey is also from the same Chuska Mountains locality and this taxon is generally considered a synonym of *Y. baileyi*. McKelvey (1947) had included *Y. baileyi* in her circumscription of *Y. standleyi* "except for the type collection", which she considered to be a hybrid with *Yucca baccata* Torrey because the pistils on the specimen are so large. She failed to account for the fact that the type of *Y. baileyi* was collected very late in the season when the pistils would be enlarging into fruits. Neither Webber (1953) nor Reveal (Cronquist et al. 1977) could support

(Continued on page 2, *Yucca*)

Botanice est Scientia Naturalis quae Vegetabilium cognitioem tradit.

— Linnaeus



(*Yucca*, continued from page 1)

her conclusion and felt the type of *Y. baileyi* was typical of the plants in that region. Only Clary (1997) has continued to use the name *Y. standleyi*. The name *Y. baileyi* is now most commonly attached to the Colorado Plateau plants that are acaulescent (rarely caulescent with short, decumbent stems) with narrow, often falcate, linear-lanceolate, plano-convex leaves; short scapes with relatively short, racemose inflorescences beginning within the leaves or near the leaf tips; relatively short, densely-flowered racemes; terete, white or pale green styles; and capsules that are not constricted near the middle, or only slightly so². Some populations in the Chuska and Zuni mountains with dense clumps of rosettes on subcaulescent branches have been named *Yucca baileyi* var. *navajoa* (J.M. Webber) J.M. Webber (1953). This is a distinctive, but sporadic variation that is considered synonymous with variety *baileyi* by Cronquist et al. (1977) and Hess and Robbins (2002).

Yucca baileyi is sympatric with *Yucca angustissima* Engelm ex Trelease, which is distinguished from the former by its longer scapes that elevate the lowest flowers of the racemose inflorescence above the tips of its long, linear leaves and somewhat smaller capsules that are markedly constricted near the middle. *Yucca angustissima* also usually has longer, less densely-flowered racemes than *Y. baileyi* var. *baileyi*. I have not recently studied the yuccas of northwestern New Mexico, but recall seeing a population with these characteristics only on the plains of western McKinley County. Hess and Robbins (2002) also confine the New Mexico distribution of *Y. angustissima* to near the Arizona border in McKinley and San Juan counties. However, Clary (1997) and Jennings (San Juan Basin Flora, in press) extend its range east to Sandoval and Rio Arriba counties where the dehiscent-fruited yucca populations combine characteristics of both *Y. angustissima* and *Y. baileyi* and often cannot be placed within either species with any satisfaction. These more eastern populations begin to resemble *Yucca baileyi* var. *intermedia* (McKelvey) Reveal, which is a taxon confined to the plains and foothills of north-central New Mexico (McKelvey 1947).

I have recently observed numerous *Y. baileyi* var. *intermedia* populations in north-central New Mexico. It consistently appears to combine the short scape (flowers begin within the leaves or near the leaf tips) and densely-flowered inflorescence of *Y. baileyi* with the relatively long raceme of *Y. angustissima*. These plants are acaulescent and usually racemose although individuals with branches at the lower nodes of the inflorescence are not uncommon. The leaves are narrow, linear or linear-lanceolate, and plano-convex. Flower tepals are usually lanceolate-acute, rarely ovate-acute or obtuse, and the outer tepals are usually darkly suffused with purple on the outer surface - like variety *baileyi* and *Y. angustissima*. The styles are always ochroleucous and usually terete or narrowly oblong. The capsules of *intermedia* are often constricted near the middle and vary between almost no constriction and deep constrictions similar to *Y. angustissima*³.

Yucca baileyi var. *intermedia* occurs mostly on plains and foothills ranging from northern Socorro County to the eastern bajada of the Manzano/Sandia range of mountains, then along the lower slopes of the Sangre de Cristo Mountains to Mora County and west to Sandoval, eastern Rio Arriba, and eastern Cibola counties. Its type locality is in western San Miguel County at the eastern limit of its range, but it is most abundant and best developed in the middle and upper Rio Grande basin counties of Valencia, Bernalillo, Sandoval and Santa Fe. Webber (1953) dismissed *Yucca intermedia* McKelvey as a hybrid between *Y. glauca* and *Y. angustissima* or *Y. baileyi*, but this taxon covers too large an area to be considered a hybrid swarm and I can find no population with styles that even begin to suggest the distinctive style characteristics of *Y. glauca*.

Reveal (Cronquist et al. 1977) resurrected McKelvey's *intermedia* as *Y. baileyi* var. *intermedia*, which is a reasonable combination

since *baileyi* and *intermedia* share the salient characteristics of short scapes and densely-flowered racemes, and are not easily distinguished from one another in northwestern New Mexico. It could have as easily been made a variety of *Y. angustissima* with which it shares long racemes and a tendency towards constricted capsules. Hess and Robbins (2002) maintained *Yucca intermedia* McKelvey as a species, but were apparently unfamiliar with it since they misrepresented its distribution as being from central New Mexico northeast to the Texas and Oklahoma border. This inaccurate range is probably the result of their making *Y. intermedia* var. *ramosa* McKelvey a synonym of *Y. intermedia*. McKelvey's var. *ramosa* is misplaced in *Y. intermedia*, which I will discuss later.

Although it has been a common practice by local authors to place *Y. baileyi* var. *intermedia* of north-central New Mexico into *Y. glauca* (Martin and Hutchins 1980, Carter 1997, Ivey 2003, Sivinski 2007, and many more), it is not the *Y. glauca* of the eastern plains and is more likely related to the dehiscent-fruited yuccas of the Colorado Plateau. Pellmyr et al. (2007) sampled the nuclear DNA of most dehiscent-fruited taxa for phylogenetic study with an analysis based on 4322 FLP markers. They found that the two *intermedia* samples from Valencia and Santa Fe counties grouped more closely with the western *Y. harrianae*, *Y. baileyi* and *Y. angustissima* samples from adjacent Arizona and Utah than with the *Y. glauca* samples taken east of New Mexico. Unfortunately, the statistical support for this genetic distinction is too low to resolve any phylogenetic patterns at regional or species levels, but does help to place this dehiscent-fruited yucca of north-central New Mexico (*intermedia*) within a group of western yuccas and not as closely related to the *Y. glauca* complex on our northeastern plains. Whether *intermedia* should be called a species or a variety of *Y. baileyi* is up to the individual taxonomist, but I am more inclined to use the varietal combination with *Y. baileyi*.

The shortgrass prairies of eastern New Mexico from the Colorado border south to Lea County are densely covered with a variable array of acaulescent yuccas with plano-convex, linear leaves that are frustratingly difficult to place in a particular taxon. The exception is the high plains of northeastern New Mexico, which is only region in the state where I have been able to find uniform populations of typical *Y. glauca*. These plants have short scapes that hold the lowest flowers of the inflorescence within the leaves of the rosette, or near the leaf tips. The inflorescence is usually a loosely-flowered raceme, but occasional plants will have short panicle branches at the proximal nodes of the inflorescence. Flower tepals are usually ovate-acute or obtuse and the styles are dark green, short and tumid.

Traveling south and east from the high plains the proportion of paniculate inflorescences increases until nearly the entire population of acaulescent yuccas of east-central and southeastern New Mexico is paniculate to some degree. The populations in southern San Miguel County and Guadalupe and Quay counties are exceedingly variable. Yuccas in this region can be densely paniculate at the proximal inflorescence nodes and racemose in the distal portion, while plants with entirely paniculate inflorescences are becoming frequent, and entirely racemose plants are rare. From De Baca County south to Lea County almost all of the plants are paniculate. My limited observations of flowers on the paniculate plants of east-central New Mexico found that the styles are also variable, being dark green, pale green, or ochroleucous and ranging from 4-10 mm long, usually less tumid than *Y. glauca*, but generally thicker than the dry, dehiscent-fruited yuccas of north-central and northwestern New Mexico. The tepals are more ovate-obtuse or acute and less darkly suffused with reddish purple in the outer whorl - like *Y. glauca*, instead of generally lanceolate-acute and more reddish purple in the outer whorl - like the varieties of *Y. baileyi*.

McKelvey's type of *Y. intermedia* var. *ramosa* was proposed

(Continued on page 3, *Yucca*)



(*Yucca*, continued from page 2)

for the more paniculate yucca populations of east-central New Mexico. The *ramosa* type specimen was taken from Tarrant County at the western edge of this variable eastern plains population of paniculate yuccas and very near the eastern range extreme of the central New Mexico population of *Y. baileyi* var. *intermedia*. She also included paniculate plants from De Baca County in her concept of variety *ramosa*, which firmly places this taxon on our eastern plains. I have not seen the variety *ramosa* type specimen, but the more revealing photo in her publication is of a relatively short-scaped, paniculate plant clearly similar to the acaulescent yuccas on the plains of east-central and southeastern New Mexico. These eastern paniculate plants are apparently more closely related to *Y. glauca* or other species further east and south than they are to *Y. baileyi* var. *intermedia*. Therefore, I believe *ramosa* is misplaced with *intermedia* as a variety and synonym.

Another taxonomic possibility for the acaulescent, paniculate yuccas of east-central and southeastern New Mexico is *Yucca campestris* McKelvey, which is also acaulescent, short-scaped, paniculate and has green, thick styles. Most authors confine the range of this species to a few counties in west-central Texas, but Martin and Hutchins (1980) and Clary (1998) extend its range to Lea County, New Mexico. I have not made a field visit to the Texas populations of *Y. campestris*, but the written descriptions and photos I have seen of this species are not significantly different in gross morphology from most of our eastern New Mexico yuccas. If our Lea County yuccas are in fact *Y. campestris*, then this name might reasonably be applied to the millions of acaulescent, paniculate yuccas across thousands of square miles of our eastern plains as far north as southern San Miguel County and eastern Union County.

Webber (1954) dismissed *Y. campestris* (and the acaulescent, paniculate yuccas of eastern New Mexico) as hybrids between *Yucca elata* Engelm. and *Yucca constricta* Buckley (of central and south Texas) with their green styles suggesting the possible entrance of *Y. glauca* into the hybrid complex. I can confirm that *Y. elata* is an influence within our generally acaulescent, paniculate yuccas in eastern New Mexico. This is evident in some occasional plants that have either short caulescent stems or relatively long scapes that lift the inflorescence well above the leaf tips, but these are regionally unusual. I cannot support Webber's belief that all the yuccas on the plains of eastern New Mexico and a large area of adjacent western Texas comprise an unstable hybrid swarm that cannot be taxonomically circumscribed. These yuccas are variable to be sure, but are huge in number and cover a vast area. They are unified by a common gross morphology of almost always being acaulescent, paniculate, and with relatively short scapes that hold the lower panicle branches within the leaves or not far above the leaf tips. With broad interpretation, the name *Y. campestris* is available for the plants of this eastern region.

West of the Pecos River in the southern portion of New Mexico most of the dehiscent-fruited yuccas fit comfortably into *Y. elata*. This species is also variable in several characteristics, but easily distinguished by its gross morphology of caulescent stems and relatively long scapes that lift the paniculate inflorescence well above the leaf tips. The stems of *Y. elata* can (rarely) reach up to five meters tall in some areas but tend to decrease in height toward the northern and eastern limits of its range until it becomes nearly acaulescent. Northern populations coming into contact with *Y. baileyi* var. *intermedia* in central New Mexico will often have some individuals with short, or no, stems and racemose inflorescence, but their longer scapes, loosely-flowered inflorescence and shorter styles keep these within the realm of the larger *Y. elata* population.

Summary

Phylogenetic studies of the genus *Yucca* have resolved relatively monophyletic groups at the taxonomic levels of section (fleshy, indehiscent-fruited *Sarcocarpa*; dry, dehiscent-fruited *Chaenocarpa*; spongy-fruited *Clistocarpa*) and the *Chaenocarpa* series *Rupicola* in Texas and adjacent northern Mexico (Clary 1997, Pellmyr et al. 2007). Many of the remaining species within *Chaenocarpa* are not monophyletic and probably reflect incomplete lineage sorting due to rapid diversification. Therefore, there may be fewer phylogenetic species of dry, dehiscent-fruited yuccas than there are taxonomically delineated species. Pellmyr et al. (2007) did find some genetic evidence of western and eastern lineages that would separate the dehiscent-fruited yuccas in western two-thirds of New Mexico from those on our eastern plains, but even these groups were indistinct and not well supported in that study.

Introgression between regionally distinguishable species of dehiscent-fruited yuccas is common and evident where populations meet, but the variations caused by hybridization and introgression are more the exceptions than the rule. Too much can be made of these obvious hybrids, which leads to taxonomic uncertainty and frustration. Webber (1953) went down this path and determined that all yuccas in nearly one-third of New Mexico (north-central, east-central and southeastern parts) could not be identified as anything but unstable hybrid swarms. However, if one ignores most of the variable details and odd individuals, there are some unifying characteristics that can be taxonomically useful for these regional populations. To be useful, the taxonomist must look for the morphological tendencies or averages in populations instead of the often variable details of particular plants⁴.

Many of the dehiscent-fruited yucca populations in New Mexico are in an evolutionary period of rapid diversification and are unlikely to be sorted as distinct species for perhaps another hundred thousand years. In the mean time, I am proposing the following key that might be useful to taxonomists who would like put names to these populations. I reserve the option to change my mind as I learn more about these fascinating plants.

Proposed Key to *Yucca* Section *Chaenocarpa* in New Mexico

- 1 Inflorescences of population predominantly paniculate, sometimes upper one-third of inflorescence racemose and lower two-thirds branched; acaulescent or caulescent with erect stems up to 5 m tall
 - 2 Population caulescent with short or tall stems; scapes long, lifting lowest panicle branches at least 3 dm above the leaf tips; southern part mostly west of the Pecos River *Y. elata*
 - 2 Population mostly acaulescent; scapes generally short, holding lowest panicle branches within the leaves or just above the leaf tips; plains of east-central and southeastern parts *Y. campestris*
- 1 Inflorescences of population predominantly racemose, sometimes with a few branches in the lowest nodes of the racemes; most plants in population acaulescent, some may have short stems usually less than 5 dm tall
 - 3 Leaves concavo-convex, narrowly lanceolate, usually 1-2 cm wide
 - 4 Scapes lifting lowest flowers of racemes at a population average of 1 dm or more above the leaf tips of the rosette; styles

(Continued on page 4, *Yucca*)



(*Yucca*, continued from page 3)

- pale green or ochroleucous; rocky ridges and hillsides within the high plains of northeastern part..... *Y. neomexicana*
- 4 Scapes short in most of the population, holding the lowest flowers of the racemes within the leaves or near the leaf tips; styles green; very rare in northwestern part in mountains and on sandstone slick rock..... *Y. harrimaniae*
- 3 Leaves plano-convex, linear or linear-lanceolate, usually less than 1 cm wide
- 5 Scapes lifting lowest flowers of the raceme 1 dm or more (population average) above the leaf tips of the rosette; racemes (lowest flower to top flower) long on most plants, often more than 1.5 times longer than the length of the leaves; capsules usually deeply constricted near the middle. plains of McKinley and San Juan counties..... *Y. angustissima*
- 5 Scapes short in most of the population, holding the lowest flowers of the racemes within the leaves or near the leaf tips; racemes long or short; capsules constricted or not
- 6 Racemes usually loosely-flowered; styles short, tumid, dark or medium green; high plains of northeastern part . *Y. glauca*
- 6 Racemes densely-flowered; styles on most plants terete or oblong-cylindric, usually ochroleucous, rarely pale green
- 7 Racemes (lowest flower to top flower) of population usually short and less than 1.5 times the length of the leaves; capsules not constricted or only slightly so; northwestern quadrant, usually in the mountains ... *Y. baileyi* var. *baileyi*
- 7 Racemes longer, most plants in population with racemes near 1.5 times and sometimes up to 2.5 times the length of the leaves; capsules often deeply constricted near the middle; north-central part, usually on plains and foothills.....
..... *Y. baileyi* var. *intermedia*

Notes

- 1 I am guilty of this by misidentifying *Yucca baileyi* var. *intermedia* as *Yucca glauca* in the Checklist of Vascular Plants in the Sandia and Manzano Mountains (Sivinski 2007).

- 2 The descriptions of *Y. baileyi* by Welsh et al. (1987) and Carter (1997) are unique in attributing pendulous fruits to this species. I have not studied *Y. baileyi* in Utah, but all the dry, dehiscent-fruited species I have ever seen (including *Y. baileyi*) have erect or spreading fruits. If pendulous-fruited populations exist in New Mexico or elsewhere, they would be very unusual and worthy of further study.
- 3 Capsule constrictions appear to be the result of yucca moth larvae feeding within the capsule or the oviposition location on the pistil by the female moths. A single yucca inflorescence can have capsules that are not constricted, constricted on all three valves, and constricted on only one or two valves. Therefore, capsule constrictions are apparently induced. Yet the propensity for a particular species' capsules to constrict under the influence of yucca moths may have some taxonomic value.
- 4 Herbarium specimens of dehiscent-fruited yuccas taken from many parts of New Mexico can be essentially useless unless the style shape and color, gross morphology of the entire plant, and morphological tendencies of the population are included on the specimen label.

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Darwin's Journals and Yours

Brian Drayton

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What do educators stand to gain from keeping a journal? A journal has long been seen as a key tool for teachers (or anyone else) seeking to reflect upon their practice and direct and deepen their own learning. Because reflective writing in science is something that we increasingly value for students, it's important for educators to understand it from the inside out, by practicing it ourselves.

There are several reasons a journal is helpful: When you revisit something, or even when you copy it from a reference into your notebook, you are focusing attention on it, and each time you do so, you may notice different aspects than you did before. Second, when you paraphrase or reword something, you have to transform it, and therefore reexamine your understanding in light of other associations or thoughts triggered by the change from, and contrast between, the "original" and your new version. Third, keeping a journal may push you to try to better distill or outline a thought, or put it into pictorial, numerical, or graphical form. This is also a powerful way to test and strengthen your understanding of the point at hand. Finally, if you are working actively with some question, your cross-references to other entries, intermediate statements, and tentative formulations ("What I think is going on here is...") are a way to stimulate increasing depth and precision of your thinking, and also are opportunities to ask, "Do I really believe this? What's my evidence? What would really clinch it—or send me back to the drawing board?"

For some people, keeping such a notebook comes naturally, but others are put off by the idea. My own up-and-down experience with journal keeping suggests that sometimes the problem is that, like any new good habit, it's hard to fit journal keeping into your already full schedule. Perhaps you, like me, have found it difficult to figure out what to put in such a journal, and how it really helps deepen and broaden thinking. How can I move beyond pure introspection, or pure stenography, and really use this text as a thinking workshop? For starters, perhaps a good comparison to have in mind is not the kind of journal that is used for personal or spiritual growth, but rather a scientist's lab or sketch book.

While pondering this some years ago, I found myself reading a lot about Charles Darwin and his creative process. In the midst of this Darwin hobby, my wife gave me an edition of Darwin's notebooks covering the years 1836-1844 (Barrett et al. 1989). From his notebooks I began to learn some lessons that helped me think more freely about how to use a journal as a tool for dialogue—not just with myself, but with my colleagues, my reading, and the subjects I was trying to understand—both in my work with science teachers, and in my scientific research in conservation biology. Between 1836 and 1844, Darwin was reading, experimenting, and imagining ways to make sense of his field experiences; he was working from the very detailed notes of his investigations toward a theory that would encompass the development of all life, including *Homo sapiens* (Gruber 1981). In this grand endeavor, Darwin's notebooks played an essential role. In them, he entered his reading notes; observations of curious phenomena he saw in his walks or visits to the zoo; interesting comments from friends or correspondents; and reflections, daydreams, hypotheses, and many questions.

Three qualities of Darwin's notebooks have helped me imagine how to make my own notebooks more creative and supportive of reflection

and learning. I have labeled these three qualities diversity, freedom, and cultivation.

Diversity

Darwin took in and wrote down things from many different sources—learned treatises, scientific journals, word-of-mouth from cronies and colleagues, personal observations, his father's opinions, folk wisdom, etc. In this sense, his notebook serves as a kind of thematic memory, keeping the manifold strands of his scientific imagining and reasoning alive and available. A key feature of this memory is that it's a jumble, with lots of different kinds of facts, ideas, gossip, notes, reflections, jostling each other in no clear order, but just as they came over the course of the days. Here are a few examples [page numbers in brackets]:

[468] Saw Humble [bumblebee] go from great Scarlet Poppy to Rhododendron—[...]. Humble alighted on base of filaments & reached nectar =again= between them, hence quite below stigma. & so avoided it. On certain days Humble seem to frequent certain flowers, to day early, the great scarlet Poppy—

[551] Sept. 4th. Lyell in his Principles talks of it as wonderful that Elephants understand contracts.—but W. Fox's dog that shut the door evidently did, for it did with far more alacrity when something good was shown him, than when merely ordered to do it.—

[463] Waterhouse showed me the component vertebrae of the head of Snake wonderful!! distinct!!—He would not allow such series showed passages—yet in talking, constantly said as the spinal marrow expands, so do the bones expand—instead of saying as the brain is created &c &c

Freedom

Don't think about what "ought" to be in a journal or notebook. Make it legible to yourself for future reference, but then include anything that helps you work on the ideas you have in mind. Darwin's notebooks contain solid facts, wild speculations, large and small questions, lists, dates, and crude drawings that convey little to any other reader, but were good enough for him. This is a reasonably good reflection of any person's mind at work, and is just right for the working journal. Here we find his ideas jammed together, feeding on each other, and co-existing for reasons that may or may not be apparent.

Very often, journal writers imagine someone reading over their shoulder and discovering just how confused and trite their thoughts really are. Darwin seems to have overcome that constraint pretty thoroughly! Your journal is yours, it is an extension of your own thinking in the same way a hammer extends the power of your hand. Write for yourself only.

[466] My view of character being inherited at corresponding age & sex, opposed by cantering horses having colts which can canter—& DOGS trained to pursuit having PUPPIES with the same powers instinctive & doubtless not confined to sex.—Is not cantering a congenital peculiarity improved. Probably every such new quality becomes associated with some other, as pointing with smell.= These qualities have been given to foetus from before sex developed—Double

(Continued on page 6, Journals)



(Journals, continued from page 5)

flowers & colours breaking only hereditary characters wh. come on in after life of Plants—also goodness of flavour in fruit—all affected by cultivation during life of individual.

[551] Plato (Erasmus) says in *Phaedo* that our " necessary ideas " arise from the preexistence of the soul, are not derivable from experience.—read monkeys for preexistence—

[234] Thomas Carlyle, saw with his own eyes. new gate. Opening towards pig.—latch on other side.— Pigs put legs over, & then snout lift up latch & back.—

Cultivation

A journal requires cultivation, as with a garden—visit, weed, move, plant, churn, fuss. A notebook really only becomes a tool for thinking if you revisit it in many ways—if you write for yourself, you also need to be a reader of your writing. Here is where the diversity and freedom of the collection become most valuable—when you revisit it with questions or concerns in mind.

Furthermore, it is important not to treat entries as sacrosanct. Argue with yourself, add better wording, raise questions, put in cross-references to later pages. In an area where you're actively thinking, it helps to keep track somehow of the layers of thinking—dating later comments, or using different ink, anything to help keep track of the twists and turns of the inner conversation. Darwin reread his notes, added to them, corrected his own mistakes, added references and wise-cracks, and later ripped out pages to use in other notebooks. In the examples below (and above), text in boldface was added at a later date, usually in a different pen or pencil.

[466] Rhododendrum--nectary marked by orange freckles on a upper petal; bees & flies seen directed to it--The Humbles in crawling out brush over anther & pistil & one I SAW IMPREGNATE by pollen with which a bee was dusted over. [rude sketch of this] Stamens & pistils curve upwards, so that anthers & stigma lie in fairway to nectary—Is not this so in Kidney Bean. How is it generally. —In Azalea it is so.—In yellow day lily, the Bees visit base of upper petal, though not differently coloured—& stamens bend up a little.

[463] Bats are a great difficulty not only are no animals known with an intermediate structure, but it is not possible to imagine what habits an animal could have had with such structure. Could anyone. have foreseen, sailing, climbing, & mud-walking fish?

[578] one carries on, by association, the question, "one [or what] will anyone, especially a women think of my face,"? to one [or one's] moral conduct.—either good or bad. either giving a beggar, & expecting admiration or an act of cowardice, or cheating.—one does not blush before utter stranger,—or habitual friends.—but half & half. Miss F.A. said to Mrs. B.A. how nice it would be if your son would marry Miss. O.B.—Mrs. B.A. blushed. analyse this:—

Darwin used his journal not just for recording, but also for interior dialogue—as a way of coming to understand his own thoughts and learning patterns. Darwin's notebooks are especially powerful, not only because of the quality of the mind displayed before us, but also because we know that for much of the time that Darwin struggled with his ideas, he could not confide in anyone else. Darwin's journals are a great source of insight about how to manage one's learning—as friends' or colleagues' journals may be, too. Ask around about how people keep their journals. For a wider perspective about how people use journals in many fields, see Fulwiler (1987). For a fascinating story by a teacher-researcher, which gives some idea of how she uses her notes and journals to reflect on her students' learning, see Ballenger (1999).

I encourage you to return with your own current burning questions to your neglected journal with diversity, freedom, and cultivation in mind, and find your own way to make this ancient, simple, and reliable cognitive tool work for you.

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Excerpts from Darwin's journals from *Charles Darwin's notebooks 1836-1844*. Reprinted courtesy of Cornell University Press.



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Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Kelly Allred [PO Box 30003, New Mexico State University, Las Cruces, NM 88003]

* *Pennisetum setaceum* (Forsskål) Chiovenda (Poaceae, fountaingrass): Doña Ana County: Las Cruces, edge of cement drainage ditch along Buena Vida Circle, N32° 17.618' W106° 43.888', 4096 ft. 15 April 2008. Jessica Dominguez 8 (NMCR). [Although this is a commonly cultivated species throughout southern New Mexico, this is the first documented report of its escape to the wild.]

— Robert Dorn [Box 1471, Cheyenne, WY 82003]

Salix nigra Marshall (Salicaceae, black willow): Quay County: Ute Lake at Logan, north side ca. 1/2 mile above dame, 3800 ft. 13 July 2007. R. Dorn 10302 (UNM). [This substantiates one previous report for this species (Great Plains Flora Association-atlas).]



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Kelly Allred

What's In A Name?

[Ever notice those two little dots above the letter e in some names of plants? Just what are they and what do they mean, you ask? A recent proposal to amend the International Code of Botanical Nomenclature (ICBN) explains matters — ed.]:

(002–003) Proposals to recommend usage of the diaeresis mark on the letter e (ë) in Latin names

[Taxon 57(1):314–315. 2008]

Jacek Drobnik & Barbara Bacler

Article 60.6 of the ICBN (McNeill & al. in *Regnum Veg.* 146. 2006) states that the diaeresis (e.g., on the letter e), indicating that a vowel is to be pronounced separately from the preceding vowel (as in *Cephaelis*), is *permissible*. In fact, *ë* exists in botanical Latin on purpose. The diaeresis mark plays an important role in botanical Latin: (1) It detaches some prefixes and suffixes from roots which begin or end with the vowels *a* or *e*, e.g., *neo-*, *pseudo-* in *Ficus neoëbudarum* Summerh., *Pseudoërnestia* (Cogn.) Krasser.; *-ensis* in *Limonium tarcoense* Arigoni & Diana. (2) The use of *ë* indicates Greek origin of roots of which names are built, e.g., Greek *aër-* ("air") is not Latin *aer-* ("bronze"), Greek *phaë-* ("glittering") is not Greek *phae-* ("brown, sombre"). (3) The letter *ë* could also differentiate the pronunciation, and it really does so, when a Latin name is read by users of a language in which it is possible to imitate the classic pronunciation. Simplified spelling is discordant with the original authors' intentions. The first taxonomists did use the diaeresis in their validly published names (see for example some Linnaean names: *Aloë* L. 1753, *Sp. Pl.*: 319–323,

Hippophaë L., l.c.: 1023–1024, and *Isoëtes* L. l.c.: 1100). Omitting the diaeresis mark makes impossible the proper understanding of the scientific names etymology, because it deforms their Greek, Latin or Latinised roots. According to Rec. 60H.1, the etymology of names should be clear. Moreover, Rec. 60A.1 states that names derived from Greek should be transliterated in conformity with classical usage. Given this, the ICBN should at least recommend usage of *ë* (it is merely *permitted* under Art. 60.6).

(002) Add a new Recommendation 60H.2 and associated Example:

"60H.2. For better understanding of names, use of *ë* is recommended in order to: (1) detach groups of letters *ae* and *oe* which belong to different roots; (2) distinguish some roots derived from Greek; and (3) facilitate appropriate pronunciation"

"Ex. 1. *Pseudoërnestia*, *Ficus neoëbudarum*, *Limonium tarcoense*, *Aëranthes*, *Aloë*, *Isoëtes* is a better spelling than *Pseudoernestia*, *Ficus-neoëbudarum*, *Limonium tarcoense*, *Aeranthès*, *Aloe*, *Isoetes*, respectively."

(003) In order to make clearer that the diaeresis is permissible, amend Articles 60.4, 60.5, and 60.6:

Add at the end of Art. 60.4: "The diaeresis on *e* is permissible too."

Add "e or *ë*" to the first sentence of Art. 60.5 so that it reads: "... where the letters *u*, *v*, or *i*, *j*, or *e*, *ë* are used interchangeably ...".

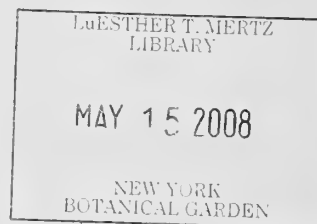
Add at the end of the second sentence of Art. 60.6 (transcription rules) the clause: "French and Dutch (but not Latin) *ë* becomes *e*." □



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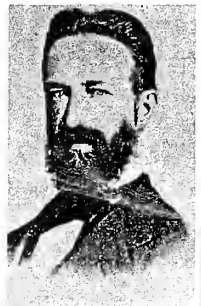
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A Newsletter for the flora
of New Mexico, from the
Range Science Herbarium and
Cooperative Extension
Service, College of
Agriculture and Home
Economics, New Mexico
State University.

François Crépín on Botanizing

by Lloyd H. Shinnars [1918-1971]



[Thanks to Bob Reeves of Las Cruces, we reprint here Lloyd Shinnars's little article from François Crépín (1830-1903). Shinnars's translation was first published in *The Asa Gray Bulletin* (3:65-76, 1955); then reprinted in *Field & Laboratory* (25:65-78, 1957). This is a delightful 1860 primer on field botany. There will be those who find Crépín corny, sentimental, and too saccharine in his descriptions of the joys of field botany. Rather, they should wonder what they are missing.]

Late in the 19th Century the younger Hooker was led to exclaim to some of the botanical students of the day, "You young men do not know your plants!" What would he think of the modern graduate in botany? Now one gets a Ph.D. in the science without knowing most of the plants he encounters every day. Chromosomes, statistics, fancied phylogenies, current fads in morphology and physiology — about such things, like the modern major general, he is "teeming with a lot of news," at least until oral exams are over. If he goes on to teach, it will be to relay the same things, occasionally refurbished, to hordes of freshmen. The general student, though he have no intention or desire to become a professional botanist, must nevertheless master the technicalities of the whole professional field. A simple, direct, spontaneous interest in plants will not do; that is not Science. But to preserve him from extreme specialization, he may be compelled to take "integrated" courses, "progressive education" courses (to what?), or "general education" courses. He must not take up any modest, specific pursuit that he can go ahead with on his own, and that will remain actively a part of his life; such things are old-fashioned.

No one has yet explained clearly just what was so bad about those old-fashioned ways. Amateur naturalists of the past century contributed heavily to the great research collections in our museums, and very many of them carried on worthy research among themselves. Their avocations were useful and beneficial both to themselves and to others; they were not merely devices to waste time. Today in America the amateur naturalist is nearing extinction. Part of this may be laid to the social trends of the times; to the rise of spectator sports and mass entertainments of a passive kind. But at least as great a share of blame must be laid to the botanical and zoological teaching of the present day. It does not lead students into participation; it deadens them with efforts to get across quantities of information and perspective that can be really absorbed or acquired only through prolonged experience.

Formerly in Europe a number of great botanical exchange clubs existed, largely patronized by amateurs. Now, after two world wars, only one survives. By two paths we can witness the realization of T. S. Eliot's flippantly grim declaration: "This is the way the world ends, Not with a bang but a whimper." Cultural impoverishment does not reveal itself only in the direct results of bombs and weapons of war.

François Crépín's *Manuel de la Flore de Belgique* was published in 1860. Typical of the many local floras and pocket guides published for most European countries, it reveals also the enthusiasm and enjoyment that botany once occasioned. It is technically respectable and adequate, in contrast with the flimsy, trivial wild flower guides which serve the American public of today. There has been an appalling deficiency of local floras in the United States — works of a kind which amateur naturalists could well undertake. Is there any prospect of such works being produced in the future, or has progress down hill already gone too far? I dare to hope that this resurrection of Crépín's words of a century ago may lead one or two moderns to attempt something of the kind.

The following somewhat free translation is of one paragraph of the foreword, and almost the whole of the first three parts of the introduction. The remainder (covering the plant geography of Belgium, the nature of plant species, a glossary, list of Belgian botanists, and publications cited, as well as the keys and catalogue of species) has been omitted.

FOREWORD

In publishing this work, it is my intention to come to the aid of the numerous pupils in our schools and of our local botanical amateurs, hitherto reduced to employing foreign books in which only an incomplete representation of our flora is found. The real desire to be useful has perhaps led me to presume upon my abilities, and has inspired me to undertake a project which others would doubtless have elaborated with better knowledge. While rightly attributing most of the imperfections of this work to the inexperience of the author, one should still be mindful of the low state in which descriptive botany finds itself in Belgium. Our weakness in phanerogamic botany cannot be concealed: it leaps to the eye of anyone who glances over our modest scientific resources. We must all work with diligence, if we would raise ourselves to the

(Continued on page 2, Botanizing)

In This Issue —

- Botanizing.....1
- Rogues Gallery6
- Field Books.....7

Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus



(*Botanizing, continued from page 1*)

level reached by our neighbors. They, I am confident, will look with kindly eye upon our efforts, and extend a hand for the courageous exertions we make to rejoin them.

BOTANIZING

Everybody knows that botanizing means taking a walk in the midst of the fields or woods with the aim of collecting plants, to study them first, then to dry them and preserve them afterwards in a herbarium.

At the start of his botanical studies, the beginner should limit himself to walks in the immediate neighborhood where he lives. There, in a quite limited area, along roadsides, in the shade of hedgerows, in fields, meadows and woods, he will encounter many unknown plants which will occupy all leisure time during the first year of study.

In his first botanical excursions, he should be restrained and content himself with a few plants which are not completely strange to him, and of which he knows the common names. Frequently, at the locality of his collecting, in the midst of a meadow or under the shade of a tree, he will stop, and, seated on the grass or on a bed of moss, will try to identify the flowers he has collected. His botany manual open on his knees, all absorbed in analyzing the different parts of a plant, pulling apart the petals and stamens, dissecting the fruit with his pocket knife, and examining all these structures with naked eye or with the aid of a lens, he will force himself to work through the key characters, couplet by couplet, which will lead him to the name of the species. With a little attention and patience, he will succeed fairly often in his first attempts at determination. What will his joy not be, to return home with a fist full of flowers that he has finally been able to name! Who is the botanist, now old, who does not recall with pleasure his earliest identifications, made out in the field, and does not remember how proud he was at being able to name an anemone, a butter-cup, or a spring *Draba* among the other mustards? Who is there who has lost all memory of those first days when he began to babble scientific jargon and talk of stamens, pistil, corolla, cauline leaves and radical leaves?

Back in his room for study, the apprentice botanist should carefully review the determinations made during his ramble, and make sure that the complete and detailed descriptions in his *Flora* apply exactly to the species he has just named by means of the analytical keys in his botany manual.

His first steps in the science will not be without some difficulties, especially if he is alone and dependent on his own resources. That which appears simple and elementary after a few months of work is singularly obscure at first; the very words calyx, corolla, stamens, so frequently repeated in the books, inspire a sort of dread. To gain an acquaintance with the names of the first plants, every means can be used: analytical keys, common names, books with illustrations, etc., etc. The first two or three dozen species to become well known will serve as landmarks, to guide one among the multitude of plants which decorate the fields and woods, and this nucleus of knowledge so painfully acquired will soon grow like a snowball. The first hundred identifications cause more difficulty than the next five hundred. If the beginner should fall in with an experienced botanist or teacher, his first difficulties will be lessened, for when he fails to figure out the name of a species, he can turn as last resort to the knowledge of another, after having exhausted all the means at his command.

During a year at least there will be no point in going farther than the neighborhood where one lives, and since the excursion will be short, one can, if necessary, do without a box for bringing back the plants; only one should choose for his outings the hours of the day when the sun is not too hot. The vasculum is often a veritable calamity for the beginner, to whom it is distasteful to appear in the streets of a village or town with this contraption at his side. After a whole season of practice and short outings, the most timid grows bold, and one sees

him, the second spring, take off resolutely with the vasculum at his back, defying the raillery of his friends and braving the gossip. I know one ardent amateur naturalist who did not care at all for using it. On seeing the beautiful specimens in his herbarium, one would never suspect the method he found for bringing them back from the field. On his walks, one would never guess he was botanizing, unless one saw him stop suddenly before a plant and collect a specimen of it, then gently place his huge felt hat on the ground and fill its ample interior with his gath-erings.

The ordinary apparel of botanists is the cause of minor tribulations. They are often taken for salesmen, land surveyors, and I know not what! Sometimes when you are busy in a meadow or at the edge of a field digging up some plant, the owner of the field or some old shepherd will drop by, full of curiosity, to watch what you are doing and invariably ask what good the plant is and what sort of drug or salve can be made with it. Don't be at all dismayed at being thus demoted to a mere herb-gatherer, and be sure to explain the purpose of your scientific work: you won't compromise yourself at all, and your questioner will leave with a smile, giving you to understand thereby that you haven't taken him in. If the sight of a vasculum results in our being taken for peddlers, of what concern to us is the opinion of the good gentlemen we happen to meet along the way?

After this first season in collecting and determining most of the common species forming more or less the bulk of the vegetation, one can undertake, about the spring of the second year, to extend one's excursions for two or three leagues around. And only after the first year of trying and experimenting does one begin to realize that in order to have a real acquaintance with plants, it is not enough just to know their names and to have dried scraps of them, but that it is necessary to study them from various aspects, at different times of their life, and to prepare complete specimens both in flower and fruit. The use of a vasculum and small trowel then become indispensable.¹ Before going any further, let us say more of these objects. For the vasculum, aluminum is preferable to zinc, on account of its light weight. Its form is that of a cylinder with square-cut ends of elliptic shape. . . . In the larger towns, one finds these vasculums ready-made at certain stores. . . . The trowel is an indispensable instrument for digging up roots and bulbs. . . . The botanist will round out his equipment with a stick of dogwood, hooked at the end. The hook of this cudgel is very useful, either for pulling to shore floating or submerged water plants, or bringing down branches of trees for the flowers or fruits, or helping oneself over trunks or stumps, climbing steep hills, or clambering among rocks. Further, this staff serves to test the ground in crossing bogs or marshes, and its weight renders it a redoubtable weapon in warding off attacks of the canine race, whose anger is sometimes aroused by the botanist's attire.

Before setting out on an all-day excursion, it is necessary to be equipped also with a Manual or analytical *Flora*, a good route book, and a book for field notes. Too often the field notebook is neglected, and I cannot sufficiently recommend it to the serious amateur who wishes to know exactly the composition of the flora of the areas he explores. These field books should be filled out right during the excursion, and the names of the species observed written right when they are found. If one waits till returning to take notes on observation, he risks making errors. Anyway, nothing is easier than to jot down in pencil as one goes along the names of the plants and their locations. If later or one proposes to publish the results in a *Flora* or systematic catalogue, he will have a valuable resource in the field notebook. It is only necessary to reorganize the many notes contained in it to have a faithful account of the territory covered. In case one does not wish to make use of them oneself, these notes will still not be without value to science for sooner or later some botanist may have need of data on the district or province studied. In either case, if one has failed to take notes of discoveries and observations, what complications will not present

(Continued on page 3, *Botanizing*)



(Botanizing, continued from page 2)

themselves, whether in publishing a Flora or in responding to requests for information? Memory must serve, but she is deceitful, and details found in the herbarium are not enough.

Apart from the scientific aspect, the field notebooks become a fascinating record to peruse. In going over these long lists of names and places, memories throng to the mind; one is transported anew to the midst of the fields, finds himself again in this or that place, in the company of friends with whom he has shared the pleasures of happy labors. The dry lists are transformed into a detailed history, in which are recorded down to the most trivial items the events of past days.

The book intended for notes may be of 50 or 100 pages of white, fairly durable paper of small format. At the end of each season, it is deposited in the library, and a new one started the next spring. The pages of one part of this small volume are divided into three vertical columns: the first for the names of the species, the second for the kind of area and nature of the terrain, the third for the name of the locality. The record for each outing is preceded by the date, and separated from the next preceding by a prominent pen-line. It goes without saying that very common species seen at every step need not be entered, but only those judged to be somewhat common, rather rare, or rare for the area.

So now our botanist is ready to take off with tools and equipment in search of the unknown. He leaves with the pleasant anticipation of returning at evening, his vasculum full of interesting items. In his rambles, let him disdain fatigue, and not confine himself to beaten paths, for, like a luckless hunter, he risks coming back as empty-handed as when he started; let him visit the corners and recesses of the woods, follow up shaded streams, and hardily climb up the cliffs. What to him is weariness if, at evening, he returns home burdened with a precious harvest? For some time his local trips will be rich in novelties, but as the country becomes better known, these discoveries will become less common. On the other hand, he will more fully appreciate the value of rarities which he happens to encounter. What emotion will he not feel, after long and difficult search, to find himself face to face with a long-coveted species, which he perhaps had known through seeing dried specimens or a picture? He will experience the real and deep joy of a hunter who bags a noble specimen of game, or of the bibliophile who discovers a rare and priceless edition. If at such a moment he is by himself, the joy of discovery will not be quite so full as if a companion were there to enjoy it with him. Solitary excursions are generally the lot of amateurs living in the country or small villages; in a town there may rarely be two botanists to join forces in their rambles and their work. These solitary walks have a tinge of sadness, but nonetheless they offer certain advantages over those more gay ones made with a small crowd. Alone with his thought, beholding the panorama of nature, and in continual communion with the objects of his studies, the observer is ceaselessly led to reflect upon the laws which govern living things, and to seek a solution to the countless problems that Nature presents everywhere. In the solitude of the woods, in the midst of an immense heath, the meditations of the naturalist are more connected, and his thoughts rise to loftier heights than between the four walls of a study room. Aside from that, the isolated searcher possesses greater freedom: he stops where he sees fit; he studies a plant at his leisure, seated against a tree or perched on a rock, and has no need to consider the impatience of a travel companion. If he has just made a valuable find, can he not still share his pleasure with his correspondents, who will rejoice in his good fortune? Whatever the drawbacks of solitude, let the botanist avoid, while botanizing, the company of those who are strangers to science, or who pursue another branch. A botanist cannot

adjust himself to the pace of a geologist, still less that of an entomologist. I strongly recommend to the isolated observer that he get in touch with kindred spirits in the region. It sometimes happens that between two neighboring districts two botanists, unknown to each other, make excursions even to the same field, without suspecting the existence of a confrere in the vicinity.

Let us go back to plant collecting, and review the various means of keeping fresh the plants taken. During the hours of the day when the sun is hottest, be careful to carry the vasculum on the shady side of the body. On warm days, plants will keep better if numerous and crowded in the vasculum. A good way of keeping them fresh is to moisten them from time to time, and to keep a layer of moss or damp grass in the bottom of the container. If ill luck should have it that there is a shower, do not stop collecting under the pretext that rain-wet specimens dry poorly and mold afterward in the herbarium. For my part, I have never encountered difficulties in preparing plants that have been rained on: in such cases one must change driers which have absorbed the external moisture of the plants sooner after putting in press. Whenever, at evening, one returns tired and hungry, and so less able to attend with proper care to the preparation of the material, it is well to leave the vasculum in a cool place or a cellar. During the night, plants slightly wilted the evening before become refreshed like the botanist, and the next morning plants and botanist function very nicely.

Before leaving for excursions of several days' duration, I want again to call the attention of beginners to several recommended practices, to help them succeed in their investigations and give an intelligent direction to their searches. A good route map (one pasted on a stiff back and folded so that it can be carried in the pocket) will be of the greatest assistance in becoming oriented in a region one did not know before, and learning the names of villages, creeks and rivers. A shortcoming of most botanists, young and old, is to follow almost the same route in going to one or another distant point in their district. They habitually stick to the same course, the same path, without wondering if to right or left there is not a field or meadow which might conceal a new species. It sometimes happens that for a whole decade one can pass by a spot which all the while contained several novelties. This eccentricity explains how botanists who are strangers to the area lead you to finds which you have over-looked. So vary your itinerary as much as possible, and take advantage in going to or from distant points of the chance to cross a field or follow a hedgerow which has not yet been inspected.

The use of a geological map is likewise most helpful. The observer living in a region of varied geological structure will notice early the marked preference of certain species either for calcareous rocks or for siliceous ones. He will be struck by the contrast presented between the rich and varied flora of limestone hills compared with the monotonous and poor one of schist outcrops. He will want to know the reason for these difference, and thus will be led to the study of plant ecology.² The desire will grow on him to check on a geological map the extent of the various rock formations of his district, to follow the continuation of these same formations into neighboring provinces and even beyond, and to see, by examining Floras of these regions, if the same species occur consistently through the entire extent of the different out-crops. This scrutiny of Floras of neighboring areas will furthermore lead him to make new discoveries. Noting the regular presence of certain species on rock types represented in his area only by isolated outcrops or narrow extensions, he will make special visits to these spots, perhaps previously neglected, and will quite often meet with success.

(Continued on page 4, Botanizing)

Botany is the natural science that transmits the knowledge of plants.

— Linnaeus



(*Botanizing, continued from page 3*)

The goal of the botanist-explorer thus becomes multiple: it is no longer merely in order to obtain plants to study and to keep in a herbarium that he botanizes, but he will remember at all times to indicate the type of habitat preferred by these same plants. To these two items will soon be added a third; for, having seen right at the start that plants do not grow indifferently in all sorts of places, he will suspect that the preference of certain plants for this or that kind of soil, which is necessarily a consequence of the breakdown in greater or lesser degree of the rocks or of their chemical composition, is often subordinate to a more general influence, that of the distribution of heat over the surface of the globe. He will thus be led to a general study of plant geography. . . . Then his studies will acquire a greater significance for him, as he realizes how much the data he assembles can advance our knowledge of plant geography. In his own district, he may perhaps be able to record the northernmost occurrence of a southern species, or the southernmost occurrence of a northern one. From a very local point of view, he will be stimulated to cooperate in advancing the knowledge of the plant geography of his own country.

A practice which I recommend to the collector is to abstract from floras and catalogues the data they contain about the territory to be explored, and to arrange the information by flowering time and locality. My work has often benefited from this useful practice. In order to have the species better in mind, it is well to read the descriptions, look at the illustrations, or examine dried specimens. If no flora has been published for the region, check those of neighboring countries with similar physical conditions, and abstract them in the same manner noted above. If one botanizes without system—in other words, without knowing its geological and mineralogical constitution, without any notion of the composition of its flora, and without taking preliminary notes, he will overlook or mistake a great many interesting species which escape the inattentive eye, because of small size, or unusual habitat, or resemblance to common species.

In concluding these recommendations, it will be worth while to warn beginners against the fear of exhausting the field of their researches within a few years. Such a fear should not be allowed to diminish one's efforts, for the more they seem likely to exhaust the area, and the more the flora becomes familiar, the more it will become plain that this fear is groundless. Finally, after several years, one will have collected 800 or 1,000 species, with a certain number of varieties, but there will still remain for study and collection those thousands of forms which constitute the varieties and minor variants of the 800 or 1,000 already obtained. And there is no guarantee that among these thousands there may not be still a certain number which are distinct but hitherto unknown, and on closer study one may have the pleasure of elevating them to the rank of species. These numerous forms are an inexhaustible mine for the industrious worker. It is true that botanizing becomes less interesting, and does not so often offer the chance to discover one of those species vulgarly called Linnean, but it can be varied from time to time by trips to neighboring districts where fellow botanists live. During the favorable months of the year, small expeditions can be arranged by two or three amateurs to distant localities. The hope of some day making a trip to the high mountains or the sea shore, or to foreign countries, may sustain the patient worker in the somewhat monotonous task of studying home species in close detail.

This leads me to some remarks about trips made out of the usual area, and lasting perhaps eight to fifteen days.

Before undertaking such an expedition, it is essential to study maps of the soil, topography and streams of the country to be visited. It is also necessary to go through the floras of the country, and enter systematically in a notebook the data they contain about sections that have already been thoroughly explored. Once the place and date have been settled, one looks to the gear to be taken. As regards clothing, this should be kept at a minimum, so that all can easily be contained in a

single overnight bag. Above all do not forget a pair of slippers, a most welcome comfort after a tiring day in hobnail boots. The overnight bag may likewise hold an elementary Flora, paper and other needs for writing and drawing, as well as dissecting 'scope, a lens, forceps and scalpels. It will be necessary to carry one or two presses with straps, and enough paper for the anticipated collections. It is not wise to leave with empty presses, in the expectation of obtaining paper on arrival, for one might be disappointed. Even in a county seat it is not always possible to obtain paper suitable for pressing plants, and the lack of it is even more to be feared in smaller towns, where it is sometimes necessary to stay.

I have assumed that such an excursion will be made with a small group, and it is then that it offers the greatest attraction. I appeal to other botanical travelers, to say if trips made in the company of two or three friends have not left them the most fresh and charming recollections. Do they not recall with lively pleasure those days when they set out bright and early, vasculum on back, when they rambled across unknown woods, meadows and bogs which promised to yield so many new things; do they not remember with enjoyment the picturesque scenes admired together, the emotions produced by the abundant collections; do they not find pleasure in thinking sometimes of those noonday halts, made under the shade of an oak or on the turfy bank of a clear stream, to eat out of hand some morsel carried that morning in the vasculum? These memories are ineffaceable, and long years afterward are still the subject of conversation among botanists.

It is better to leave in the morning and return at night than to divide the day in two. While traveling, after having seen to gastronomic needs, it is necessary, instead of resting, to busy oneself forthwith in caring for the plants collected during the day. It is a job which must not be left till the next morning, for upon arising it is necessary to change driers of specimens of the previous evening and preceding days, and spread them out so that they can dry and be ready, by day's end, to receive a new batch of specimens. After these duties, and before breakfasting, one takes notes on plants left for this purpose in the vasculum the previous evening. Days thus passed in botanical travel are laborious, but on returning home, one has truly won the right to repose, and the leisurely study of the fruits of his endeavors.

Collection and Preparation of Specimens. Herbarium.

Plants intended for the herbarium should, so far as possible, be collected in dry weather. Each one should be collected with all parts. If the plant is herbaceous, of small or medium size (which is most often the case), collect it entire, with root or base; if it is tall, the upper part and some basal leaves will do. For trees and shrubs, it is sufficient to take branches with a bit of bark. Finally, if the plant is a parasite, collect it with a bit of the species to which it is attached.

Do not confine yourself to collecting species in flower only, but take fruiting specimens also; further, if the plant loses its lower leaves before flowering time, take the trouble to collect rosettes in winter. The species should be so represented in the herbarium that it can be studied completely from the earliest leaves to final maturity.

Ordinarily a certain number of plants will necessarily be ruined by dissecting for study, and it is always well to collect several: the best are kept for the herbarium. If it happens that a species of one's area is very rare elsewhere, provision should be made to satisfy the needs of correspondents. However, one should take care not to exterminate rare or interesting plants at their localities. There are already so many destructive influences that the botanist concerned about the future should avoid impoverishing the area of his studies by unrestrained collecting; he should even be careful about revealing the stations where certain rare plants grow to any but amateurs on whose discretion he can de-

(*Continued on page 5, Botanizing*)



(*Botanizing, continued from page 4*)

pend. To anyone conscious of the importance and interest of plant geography, such a caution is superfluous. The botanist planning to collect for exchange should select localities where the species occurs in abundance. A good way to conserve those less plentiful is to collect only the tops, and not to take roots, bases or bulbs.

On returning home after each trip, one takes care of the day's collections. If this job is postponed to the next day, the plants should be kept in a cellar or other cool place. They should be carefully removed from the vasculum and neatly arranged in drying papers. . . . In the center of each sheet, place one plant, or several if they are small, laying them out with care, and always without changing the natural direction of branches, leaves and roots. If the plant is very bushy, one may remove branches or leaves; if the stem exceeds the size of the sheet, it can be bent down at a sharp angle. One should not remove dead stalks or leaves which may be present at the base of the plant, on artistic grounds; these remains are of great value for study. . .

When first one tackles the job of drying, a thousand cares will be taken: the petals of each flower are spread out with the most scrupulous attention, the leaves separated from one another by slips of paper, etc.; finally a great deal of time will be consumed by a single specimen. Drying under such conditions becomes a very tedious job, able to repel the most courageous. Actually the extra pains are unnecessary: plants tossed on the drying sheets, stuck in bundles, lightly pressed at first, then gradually more strongly so, with frequent change of driers, are just about as well prepared as those dried with minute care. With a little practice, the drying of plants becomes easy, and one becomes able to dispose of large numbers of specimens rapidly and without excessive effort. . . .

LIBRARY OF THE YOUNG BOTANIST

He who commences the study of botany is often faced with difficulty in choosing elementary books suitable for an introduction to the science. As if by a kind of fatal affliction, it is not at all rare to see him assemble a small library of quite mediocre books, or even plain bad ones. If he wishes to study botany as a simple amateur, the books listed below will suffice him, but if he plans to delve more deeply into some phase of the science, he will need to have a lot of other publications. I have listed works in different languages, for nowadays it has become indispensable to know several foreign languages: the scholar or the serious amateur must consult the writings of botanists who use German, French, Italian, etc.

Elementary Works

- DE JUSSIEU (Adrien). *Cours Elementaire de botanique* . . . —A new edition is printed almost every year.
- RICHARD (Achille). *Nouveaux elements de botanique et de physiologie vegetale*. De Saint-Hilaire (Auguste). *Lemons de botanique*.
- DE CANDOLLE (A. Pyr.). *Organographie vegetale*. — *Physiologie vegetale*.
- LINDLEY (J.). *An introduction to botany*.
- LINNE. *Philosophia botanica*.
- DE CANDOLLE (A. Pyr.). *Theorie elementaire de la botanique*.
- GERMAIN (Ernest). *Guide du botaniste*.

General Works on the Classification of Plants

- LINNE. *Genera plantarum*.
- ENDLICHER (Steph.). *Enchiridion botanicum*.
- LINNE. *Species plantarum*.
- WILLDENOW (C.-L.). *Linnaei Species plantarum*.
- ROEMER ET SCHULTES. *Systema vegetabilium*.
- SPRENGEL. *Linnaei Systema vegetabilium*.
- DE CANDOLLE (A. Pyr.). *Prodromus systematis naturalis* . . .

[from Shinnars—]

Crepin's words are apt to be read with some condescension by the modern reader who, especially if he is a professional botanist, may find them naive and unsophisticated. But how many moderns, even with a bachelor's degree, would consider works of equivalent calibre to those by Linnaeus, De Candolle, and Lindley, in three different languages, suitable for beginners in botany? Yet Crepin was writing for persons who did not possess even the equivalent of a high-school education (at least in number of years of schooling). I have at hand a recent paper-backed booklet on American wild flowers, full of colored pictures, but with only sketchy and superficial descriptions, no keys, and not a single mention of a Latin name. What would Crepin have thought of such milk and water?

Late in the 19th century a sensitive English observer wrote that the United States had successfully solved its political and economic problems, but not the human one. Had Matthew Arnold been a botanist, he might have made some qualification, for in his day at least botanical study worthy of the name was a popular avocation, as attested by the wide sale of works by Asa Gray, Alphonso Wood, and Mrs. Lincoln (none of whom avoided Latin names, keys, or technical terms) to a public among whom college degrees were a rarity. Progress within technical fields is easily mistaken for universal progress.

In the often repeated comment of a famed though fictional Belgian detective, "It gives one to think."

Translator's Notes

¹In the distant wilds of the U.S. of North America, especially in drier regions, it may prove better to collect directly into the plant press, and eschew the use of the vasculum altogether. Also, a small hand pick or geologist's hammer, or a heavy knife, may serve better than a trowel.

²"Phytostatiques" was Crepin's word; ecology was not to be invented for another third of a century.

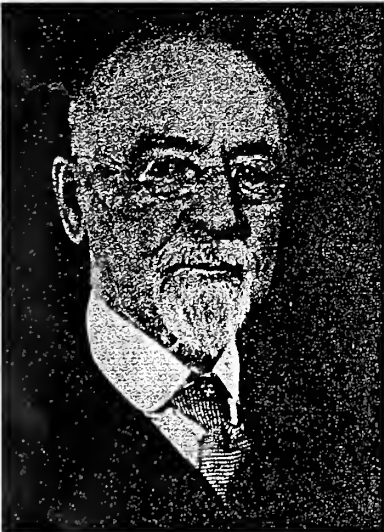
[If, after reading his translation of Crépín, you find yourself wondering about Lloyd Shinnars, I recommend "Lloyd Herbert Shinnars: By Himself" by Ruth Ginsberg, 2002, Botanical Research Institute of Texas. In addition, I list below "elementary books suitable for an introduction to the science" of New Mexico Botany—ed.]

- Allred, K.W. 2005. *A Field Guide to the Grasses of New Mexico*, 3rd ed. Agric. Exp. Sta. New Mexico State University. 388 pp.
- Allred, K.W. 2007. *A Working Index of New Mexico Vascular Plant Names*. <http://cahe.nmsu.edu/academics/rangescienceherbarium/a-working-index-of-new-m.html>
- Correll, D.S. & M.C. Johnston. 1970. *Manual of the Vascular Plants of Texas*. Texas Research Foundation, Renner, Texas.
- Cronquist, A. et al. 1972+. *Intermountain Flora*. New York Botanical Garden Press.
- Dick-Peddie, W.A. 1993. *New Mexico Vegetation: Past, Present, and Future*. Univ. New Mexico Press, Albuquerque. 244 pp.
- Elpel, T.J. 2004. *Botany In A Day: The Patterns Method of Plant Identification*. Hops Press, Pony, Montana. 221 pp.
- Flora of North America Editorial Committee, eds. 1993+. *Flora of North America North of Mexico*. 12+ vols. New York and Oxford.
- Harris, J.G. & M.W. Harris. 1994. *Plant Identification Terminology, An Illustrated Glossary*. Spring Lake Publ., Spring Lake, Utah. 197 pp.
- Ivey, R.D. 2003. *Flowering Plants of New Mexico*. 4th ed. Publ. by the author. 573 pp.
- Judd, W.S. et al. 2008. *Plant Systematics: A Phylogenetic Approach*. 3rd ed. Sinauer Assoc., Sunderland, Massachusetts.
- Kearney, T.H. & R.H. Peebles. 1969. *Arizona Flora*. With Supplement by J.T. Howell and E. McClintock. Univ. California Press.
- Martin, W.C. & C.R. Hutchins. 1980, 1981. *A Flora of New Mexico*. Vols. 1, 2. Vaduz, West Germany, J. Cramer. 1276 pp.
- Weber, W.A. & R.C. Wittmann. 2001. *Colorado Flora: Eastern & Western Slope* (2 vols.), 3rd ed. University Press of Colorado, Boulder.
- Welsh, S.L. et al. 2003. *A Utah Flora*. 3rd ed. Brigham Young Univ. Print Services. 912 pp.
- Wootton, E.O. & P.C. Standley. 1915. *Flora of New Mexico*. Contr. U.S. Natl. Herb. 19:1-794.



Who Are These Guys?

Can you name these botanists, and a plant named after them?





Notebooks, Again...!

From my continued preoccupation with field notes and journals comes this extract from the field book of Willis Linn Jepson, extraordinary California botanist of the last century. More than 60 of Jepson's field books are available online through the courtesy of the Jepson Herbarium (http://ucjeps.berkeley.edu/images/fieldbooks/jepson_fieldbooks.html). The pages below are from an account of a field trip on 15 June 1941, to the hills of the Tiburon Peninsula, Marin County, north of San Francisco. I have excerpted his account of the lunch stop.

For a luncheon ^{spot}, we took a side road in the town at Tiburon and, parking the car off the wagon-track, we climbed through a barbed-wire fence and went up an oak-covered slope into a little glade. We had that consomme, fried chicken, black olives, shrimps, green olives, avocado, a variety of sandwiches, shoe-string potatoes, cucumbers, frosted and unfrosted cake, and a lot of other things I have forgotten. As

June 15, 1941.

19

We sat here under the oaks, a view, broad and stirring, opened southward - a series of contrasts: the oak-covered slope; a marsh at foot of ^{the} hill filled with rushes and tules; a playing field bordering the village of Tiburon with a base-ball team and spectators; next the seaway of the Golden Gate and rising as its hills southward the skyline of San Francisco; the sky-scrapers on Nob Hill, the tall business blocks to the left; Russian Hill, and finally Telegraph Hill with its tall Coit Tower.





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45

A Newsletter for the flora of New Mexico, from the Range Science Herbarium and Cooperative Extension Service, College of Agriculture and Home Economics, New Mexico State University.

Second Statistical Summary of the Flora of New Mexico

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It has been five years since the first Statistical Summary of the Flora of New Mexico (The New Mexico Botanist 28:1-7, 2003). Since 1995, when we first began keeping score, there has been an average of 34 new species recorded for the state each year. I take this summary from the recently published "Flora Neomexicana I: The Vascular Plants of New Mexico (Allred 2008, available at lulu.com).

Group	Genera	Native Species 88%	Exotic Species 12%	Total Species	Additional Intraspecific Taxa	Total Taxa
Ferns & Fern Allies	28	83	1	84	4	88
Gymnosperms	7	28	0	28	2	30
Dicots	747	2503	325	2828	381	3209
Monocots	199	624	132	756	65	821
Totals	981	3238	458	3696	452	4148

In This Issue —

- Statistical Summary of New Mexico plants 1
- Plant Distribution Reports 7
- Botanical Literature ... 7

Ferns and Fern Allies						
Family	Genera	Species				
		Native 99%	Exotic 1%	Total Species	Additional Intraspecific Taxa	Total Taxa
Aspleniaceae	1	4	0	4	0	4
Azollaceae	1	1	0	1	0	1
Dennstaedtiaceae	1	1	0	1	0	1
Dryopteridaceae	6	15	0	15	0	15
Equisetaceae	1	6	0	6	0	6
Isoëtaceae	1	1	0	1	0	1
Lycopodiaceae	2	3	0	3	0	3
Marsileaceae	1	1	0	1	0	1
Ophioglossaceae	2	7	0	7	0	7
Polypodiaceae	1	2	0	2	0	2
Pteridaceae	9	31	0	31	3	34
Salvinaceae	1	0	1	1	0	1
Selaginellaceae	1	11	0	11	1	12
Totals	28	83	1	84	4	88

Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus



Gymnosperms						
Family	Genera	Species				
		Native 100%	Exotic 0%	Total Species	Additional Intraspecific Taxa	Total Taxa
Cupressaceae	2	8	0	8	0	8
Ephedraceae	1	6	0	6	0	6
Pinaceae	4	14	0	14	2	16
Totals	7	28	0	28	2	30

Dicotyledonous Plants						
Family	Genera	Species				
		Native 86%	Exotic 14 %	Total Species	Additional Intraspecific Taxa	Total Taxa
Acanthaceae	10	11	0	11	0	11
Adoxaceae	2	3	0	3	2	5
Aizoaceae	2	2	0	2	0	2
Amaranthaceae	9	26	7	33	5	38
Anacardiaceae	2	6	0	6	6	12
Apiaceae	36	59	10	69	1	70
Apocynaceae	5	10	1	11	3	14
Araliaceae	1	1	0	1	0	1
Aristolochiaceae	1	2	0	2	0	2
Asclepiadaceae	4	35	0	35	1	36
Asteraceae	135	577	52	629	92	721
Berberidaceae	1	6	1	7	0	7
Betulaceae	3	5	0	5	0	5
Bignoniaceae	2	2	1	3	1	4
Bixaceae	1	1	0	1	0	1
Boraginaceae	17	57	4	61	13	74
Brassicaceae	49	101	51	152	26	178
Buddlejaceae	1	1	0	1	0	1
Cactaceae	14	58	1	59	8	67
Campanulaceae	4	7	1	8	1	9
Cannabaceae	3	4	2	6	0	6
Capnifoliaceae	5	15	4	19	0	19
Caryophyllaceae	18	53	13	66	3	69
Celastraceae	2	2	0	2	0	2
Ceratophyllaceae	1	1	0	1	0	1



Chenopodiaceae	18	43	20	63	10	73
Cistaceae	1	2	0	2	0	2
Cleomaceae	4	8	1	9	1	10
Convolvulaceae	7	40	5	45	2	47
Cornaceae	1	2	0	2	0	2
Crassulaceae	2	7	0	7	2	9
Crossosomataceae	2	2	0	2	1	3
Cucurbitaceae	12	13	4	17	2	19
Elaeagnaceae	2	2	1	3	0	3
Elatinaceae	2	3	0	3	0	3
Ericaceae	10	19	0	19	0	19
Euphorbiaceae	11	69	3	72	2	74
Fabaceae	55	239	33	272	76	348
Fagaceae	1	15	0	15	0	15
Fouquieriaceae	1	1	0	1	0	1
Frankeniaceae	1	1	0	1	0	1
Fumariaceae	1	2	0	2	1	3
Garryaceae	1	2	0	2	0	2
Gentianaceae	10	21	1	22	2	24
Geraniaceae	2	7	1	8	0	8
Grossulariaceae	1	10	0	10	1	11
Haloragaceae	1	3	2	5	0	5
Heliotropaceae	1	4	0	4	1	5
Hydrangeaceae	4	5	0	5	4	9
Hydrophyllaceae	5	33	0	33	1	34
Hypericaceae	1	2	0	2	0	2
Juglandaceae	1	3	0	3	0	3
Koeberliniaceae	1	1	0	1	0	1
Krameriaceae	1	3	0	3	0	3
Lamiaceae	21	29	9	38	6	44
Lentibulariaceae	1	1	0	1	0	1
Linaceae	1	13	1	14	0	14
Loasaceae	2	20	0	20	3	23
Loganiaceae	1	1	0	1	0	1

Botany is the natural science that transmits the knowledge of plants.

— *Linnaeus*



Lythraceae	5	6	1	7	0	7
Malpighiaceae	2	2	0	2	0	2
Malvaceae	14	36	8	44	5	49
Meliaceae	1	0	1	1	0	1
Menyanthaceae	1	1	0	1	0	1
Molluginaceae	1	1	1	2	0	2
Moraceae	2	1	2	3	0	3
Nyctaginaceae	10	39	0	39	7	46
Nymphaeaceae	2	1	2	3	0	3
Oleaceae	5	14	3	17	0	17
Onagraceae	9	58	0	58	10	68
Orobanchaceae	9	46	0	46	2	48
Oxalidaceae	1	6	0	6	1	7
Papaveraceae	3	5	2	7	2	9
Parnassiaceae	1	2	0	2	0	2
Passifloraceae	1	1	0	1	0	1
Pedaliaceae	1	4	0	4	0	4
Phytolaccaceae	2	2	0	2	0	2
Plantaginaceae	16	83	10	93	11	104
Platanaceae	1	1	0	1	0	1
Plumbaginaceae	1	1	0	1	0	1
Polemoniaceae	11	58	0	58	5	63
Polygalaceae	2	13	0	13	1	14
Polygonaceae	12	76	13	89	11	100
Portulacaceae	5	25	3	28	2	30
Primulaceae	8	14	2	16	0	16
Rafflesiaceae	1	1	0	1	0	1
Ranunculaceae	12	60	4	64	3	67
Resedaceae	1	1	0	1	0	1
Rhamnaceae	6	14	0	14	1	15
Rosaceae	25	69	10	79	13	92
Rubiaceae	7	22	1	23	4	27
Rutaceae	3	3	0	3	5	8
Salicaceae	2	30	4	34	5	39
Santalaceae	1	1	0	1	0	1
Sapindaceae	3	5	0	5	4	9
Sapotaceae	1	1	0	1	0	1



Saururaceae	1	1	0	1	0	1
Saxifragaceae	5	25	0	25	0	25
Scrophulariaceae	3	6	3	9	0	9
Simaroubaceae	1	0	1	1	0	1
Solanaceae	9	31	15	46	6	52
Sterculiaceae	1	3	0	3	0	3
Tamaricaceae	1	0	3	3	0	3
Ulmaceae	1	0	1	1	0	1
Urticaceae	3	5	1	6	1	7
Verbenaceae	8	28	2	30	5	35
Violaceae	2	8	0	8	0	8
Viscaceae	2	12	0	12	0	12
Vitaceae	3	5	0	5	0	5
Zygophyllaceae	5	5	3	8	0	8
Totals	747	2503	325	2828	381	3209

Monocotyledonous Plants						
Family	Genera	Species				
		Native 83%	Exotic 17%	Total Species	Additional Intraspecific Taxa	Total Taxa
Agavaceae	2	17	0	17	4	21
Alismataceae	3	11	0	11	0	11
Alliaceae	2	13	0	13	1	14
Amaryllidaceae	1	1	0	1	0	1
Anthericaceae	2	2	0	2	0	2
Asparagaceae	1	0	1	1	0	1
Asphodelaceae	1	0	1	1	0	1
Bromeliaceae	1	1	0	1	0	1
Commelinaceae	2	5	0	5	1	6
Convallariaceae	2	3	0	3	0	3
Cyperaceae	14	142	1	143	1	144
Hyacinthaceae	1	0	1	1	0	1
Hydrocharitaceae	4	6	1	7	0	7
Hypoxidaceae	1	1	0	1	0	1
Iridaceae	2	6	1	7	0	7
Juncaceae	2	26	0	26	1	27
Juncaginaceae	1	2	0	2	0	2



Lemnaceae	2	9	0	9	0	9
Liliaceae	7	11	0	11	1	12
Melanthiaceae	4	7	0	7	0	7
Nolinaceae	2	6	0	6	0	6
Orchidaceae	14	30	1	31	4	35
Poaceae	118	301	123	424	50	474
Pontederiaceae	1	2	0	2	0	2
Potamogetonaceae	2	12	1	13	2	15
Ruppiaceae	1	1	0	1	0	1
Sparganiaceae	1	3	0	3	0	3
Themidaceae	3	3	0	3	0	3
Typhaceae	1	2	1	3	0	3
Zannichelliaceae	1	1	0	1	0	1
Totals	199	624	132	756	65	821



Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Joe Ward [905 Deer Trail, Farmington, NM 87401]

Leymus cinereus (Scribner & Merrill) Love (Poaceae, Great Basin wildrye): San Juan County: at Ward residence, 905 Deer Trail, Farmington, NM, riparian bosque along La Plata River, 8-9 feet tall, 7 Aug 2008, Joe Ward s.n. (NMCR).

[An earlier report of *Leymus cinereus* was in error, the specimen being *Leymus racemosus*. This marks the first validated specimen known from the state. It is considered native in that habitat along the San Juan River.]

— Richard Spellenberg [Biology Department, New Mexico State University, Las Cruces, NM 88003]

****Ipomoea cordatotriloba*** Dennst. var. ***torreyana*** (A. Gray) D. Austin (Convolvulaceae, Torrey's tievine): Doña Ana

County: Las Cruces, N side of Telshor Blvd. 1 block SW of junction with Del Rey Blvd., 32°20'57.4" N, 106°45'55.5"W. Elev. 1245 m. Weed twining in shrubs of commercial landscaping between parking lot and sidewalk. Corolla pale rose-violet, violet in tube, the exterior uniformly paler. 3 Oct 2008, R. Spellenberg 14069 (BRIT, NMC). Identification confirmed via photos by Dan Austin. [Apparent first report for NM of this central Texas perennial, probably arriving in soil associated with landscape shrubbery. I had been riding my bicycle past this all summer noting that I did not know this morning glory; making this collection showed why. I have not seen it elsewhere in the area.]

Botanical Literature of Interest

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Allred, K.W. 2008. **Flora Neomexicana I: The Vascular Plants of New Mexico** (An annotated checklist to the names of vascular plants, with synonymy and bibliography). Available at lulu.com.

Heklau, H. & M. Roser. 2008. **Delineation, taxonomy and phylogenetic relationships of the genus Krascheninnikovia** (Amaranthaceae subtribe Axyridinae). Taxon 57(2):563-576.

Kindscher, K. & W. Norris (eds.). 2008. **Proceedings of Natural History of the Gila: A Symposium** held October 6-8, 2006. The New Mexico Botanist Special Issue 1. Available online at the Range Science Herbarium homepage ([http://](http://cahe.nmsu.edu/academics/rangescienceherbarium/)

cahe.nmsu.edu/academics/rangescienceherbarium/), and take the link to The New Mexico Botanist newsletter, or hard copies may be requested from Bill Norris (norrisw@wnmu.edu, or Department of Natural Sciences, Western New Mexico University, Silver City, NM 88061).

Krings, A., D.T. Thomas, & Q. Xiang. 2008. **On the generic circumscription of *Gonolobus* (Apocynaceae, Asclepiadoideae): Evidence from molecules and morphology.** Syst. Bot. 33(2):403-415.

Welsh, S. L. 2007. **North American Species of *Astragalus* Linnaeus (Leguminosae).** Stanley L. Welsh Herbarium, Monte L. Bean Life Science Museum, Brigham Young University, Provo, UT. 932 pp.



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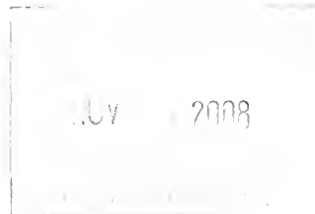
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In This Issue —

- C.R. Hutchins 1
- What's in a Name? 3
- Nama in NM 4
- Botanical Literature ... 6
- Plant Distribution Reports 7

The New Mexican from Texas: Charles R. Hutchins

by Gene Jercinovic

One day in 1969, a forty-one year old plant collector was working in the Bonito Canyon area in the Sacramento Mountains in Otero County, New Mexico. He came down to his vehicle and discovered a stranger nearby. The stranger said that he had noticed plant presses in the vehicle and wondered who could be collecting in the area. The plant collector was Charles Robert Hutchins, commonly known as Bob, who a dozen years later would be the co-author of *A Flora of New Mexico* with William C. Martin. The stranger was Donovan Correll, who a decade later would be the co-author of the *Manual of the Vascular Plants of Texas* with Marshall C. Johnston.

Bob Hutchins was born on May 26, 1928 to William C. and Exa Hutchins in Atwell in Callahan County, Texas, about 30 miles east of Abilene. After three years, the family moved to a farm near Content, Texas in Runnels County, roughly 30 miles south of Abilene. Bob started his education at the Content School, which had 4 or 5 rooms. Two grades were housed in each room. The High School was in nearby Lawn. At the time Texas schools only went through the 11th grade. Bob graduated in 1945. During his high school years he was a typical farm boy. He had no particular interest in science or plants.

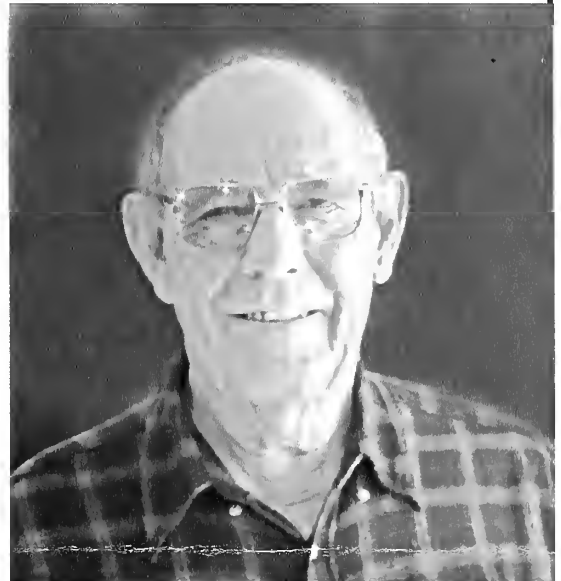
He decided to go directly to college. He thought about becoming an engineer, but decided on Agricultural Education. He chose to attend John Tarleton Agricultural College, a two-year institution in Stephenville, 90 miles east of Abilene. There he met Imogene "Gene" Schrank. At the end of two years, they decided to continue their education at Texas Tech University in Lubbock, graduating in May 1950. The couple married in June.

Bob's degree was in Agricultural Education. In July 1950 he accepted a job as an Ag teacher in Westbrook, Texas, which he described as "...a wide place in the road between Big Spring and Colorado City." Throughout his college years, Bob had been active in ROTC. During the fall of 1950, Korean War hostilities began to intensify and it was inevitable that Bob would be called into service. The United States Army summoned him early in 1951.

By February he was a soldier at Ft. Hood in Killeen, Texas, as a member of the 2nd Armored Division. In July, his unit was deployed to Germany near Mannheim. Gene was pregnant with the Hutchins' first son James and went to live with her parents in Hamilton County south of Stephenville. The 2nd Armored Division was a combat division, which had to be prepared to go into the field at 85% strength on two hours notice. As a result, there was little opportunity for travel or entertainment. In April of 1952, Gene and James were able to come to Germany. A second son, Larry, was born there.

The family returned to the United States in April of 1954 and Bob was discharged from the

(Continued on page 2, Hutchins)



Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus



(Hutchins, continued from page 1)

Army in May. They returned to the Lubbock area where Bob accepted a position at Cooper's School in nearby Woodrow. A third son, Steve, arrived soon after. Bob also entered graduate school at Texas Tech to pursue a Masters in Agricultural Education, which he received in 1957. At this point the family returned to Westbrook, where another son, Daniel, was born in 1958, and a daughter, Debra in 1960. Bob became a science teacher and served for two years as principal. In 1962, he began an involvement with National Science Foundation summer programs at Texas Tech, which allowed him to study various aspects of science.

In 1964, the family moved to Post, Texas (founded by C. W. Post of cereal fame). Bob taught for 2 years, managed to obtain administrative certification, and served as principal for 2 years. Meanwhile, he continued his involvement with the NSF program and began the pursuit of a Master's degree in science. A class in plant taxonomy under Chester Rowell particularly stimulated him and started him on his lifelong journey in plant collecting. He decided to do his thesis on the Flora of Garza County. Post, the Hutchins home base, was the county seat. He made some fascinating discoveries in the course of his research, a colony of wild orchids, peculiar in caprock country, an Egyptian lotus in a stock tank, and #1172, a collection of *Pilostyles thurberi* on *Dalea*, a holy grail for collectors in the southwest.

In the spring of 1968, Bob received an M.S. from Texas Tech. His field studies of Garza County had given him great pleasure and fulfillment. The humdrum routine of the school in Post loomed ahead. During the past several years Bob's interest in science and plants had grown immensely. He had become involved with the American Association for the Advancement of Science, going to meetings and even presenting papers. Through his friendship with Chester Rowell and his membership in AAAS he had developed a relationship with William C. Martin, Associate Professor of Biology of at the University of New Mexico. In August of 1968 the Hutchins family decided to move to Albuquerque to give Bob a chance to continue the study of plants.

Bob landed a job as a science teacher at Monroe Jr. High and Gene worked as a substitute teacher for the Albuquerque Public Schools. Bob began taking classes at UNM. After a year at Monroe he became as assistant principal at Sandia High School. Gene worked towards librarian certification and became an elementary school librarian for the rest of her career. Bob also started working seriously on a project he had dreamed about since 1962. In that year he had taken a field trip to the Sacramento Mountains of Otero County in New Mexico as part of the NSF summer program at Texas Tech. He envisioned the possibility of preparing a flora of the area. He worked on the project for years, eventually self-publishing *A Flora of the White Mountains of Southern Lincoln and Northern Otero Counties* in 1974. Meanwhile, his studies at the University slowed. His passion was plants. The curriculum required courses like zoology and genetics, which did not interest him. He abandoned course work and devoted himself to the joy of hiking the state gathering plant specimens.

Bob remained at Sandia High until 1974, when he moved to Eldorado High. Then, in 1975, he accepted a position at the

newly established Career Enrichment Center of the Albuquerque Public Schools, where he remained until 1981. Next came an assignment at Rio Grande High for four years. He then transferred to Highland High, where he remained until his retirement in 1989. While at Eldorado, he decided to return, one more time, to coursework at the University, this time pursuing a Ph.D. in Education, which he achieved in 1979.

During the years in which he explored the Sacramentos for plants, Bob spent much time with Bill Martin. They developed a close friendship. Despite Bob's lack of interest in the complexities of phylogenetics, biochemistry and plant anatomy and physiology, he and Bill shared a common interest in taxonomy and the study of plant distributions. They had also built a comfortable working relationship. This would lead to what may have been the most significant collaboration in each of their lives.

In 1958, when Bill Martin was hired at UNM, the outstanding figure in the Biology Department was Edward Castetter, who became head of the department when he was hired in 1928. Castetter had done much work in ethnobotany, cacti, and general floristics during his career. In 1958, Castetter was vice-president of the University, Dean of the Graduate School, as well as head of the Biology Department, and, in his mid-sixties, getting ready to retire. Castetter, in the twilight of a distinguished career, had two remaining dreams, a treatment of cacti in New Mexico, and the presentation of a new flora of New Mexico. He told Bill Martin that he was more concerned with cacti, and that Bill should consider adopting the flora project. Bill believed in the concept and started fieldwork in the early 60's to achieve the goal. Martin and Castetter worked together to assemble *A Checklist of Gymnosperms and Angiosperms of New Mexico* in 1970. The appearance of Bob Hutchins in the late 60's provided the perfect opportunity to complete the project.

For the decade of the seventies Bob and Bill labored on the flora. Bob contributed his *Flora of the White Mountains* and did extensive field work throughout the state. Bill's graduate students also provided much material. In the late seventies Bill began typing the manuscript. Bob prepared all of the range maps. Bill was approached by the German company J. Cramer about the possibility of publishing the flora. Section by section, the huge manuscript was sent to Germany. Virtually no editing was done by the publisher. The two-volume *A Flora of New Mexico* appeared in 1980-81.

After the Flora was published, neither Bill nor Bob was fully pleased. Bob summarized: "After we got through with the flora, we knew we had left out a lot of things. We slipped up on some things. We did not intend to put Krameriaceae in the Leguminosae family, but we did." They thought about producing a revised checklist, but after some 30 years of combined effort, they soon lost momentum.

During the eighties, Bob continued his efforts in exploring the state and gathering specimens of its plants, concentrating on legumes. By the early nineties, he developed back problems and had to curtail his fieldwork. In his career he collected 13,308 specimens. Of these 7479 were placed at UNM. Among these thousands are two New Mexico collections of the elusive

(Continued on page 3, Hutchins)



(Hutchins, continued from page 2)

Pilostyles thurberi, the only two specimens of this species listed by the New Mexico Biodiversity Collections Consortium. The remainder of his collections were placed in herbaria at the University of North Carolina and Texas Tech University. Even in retirement he managed to contribute. One day he received a phone call. Bob recalls:

John Kartesz called me one day and asked me if I knew anyone who had a collection of plant pictures, because in his work he wanted to add pictures. I said, well, John, I happen to have a few thousand. I sent him all my slides and let him sort through and pick what he wanted to use.

The relationship lasted for years.

Bob Hutchins has done much to further the understanding of the plants of New Mexico and their distributions. He was not an academician. He was not one to publish articles in scientific journals. He was a careful observer and found his greatest re-

wards in the field, traveling tirelessly through the deserts and mountains of the state seeking the new and the different. He has often been misinterpreted. He was certainly tenacious in his domain. He never saw himself as an authority or a genius. He simply wanted to be a part of the botanical community and add as much as he could to the knowledge of the natural world.

Bob Hutchins passed away on December 26, 2008. He was first and foremost dedicated to his family. His eldest son Jim tried to express his feelings:

"I cannot tell you how important it is to me and my family that folks, whether in the botany community or not, understand how much my Dad affected not only our lives, but contributed to the scientific community. I grew up as a son of this man. You get questions about who you respect. It's simple; I want to be like my Dad. He was the anchor in our family for eighty years. I miss him and there are no replacements."



What's In a Name?

Ever wonder about the rules governing eponymous plant names (names honoring people)? Particularly noticeable is the fact that the names honoring men have different endings than those honoring women (long live the difference!).

Eponymous names are created according to the International Code of Botanical Nomenclature, of which the most recent edition is from 2006, referred to as the Vienna Code (available online at <http://www.ibot.sav.sk/icbn/main.htm>). Here we learn that the specific epithet may be substantival (like a noun), or adjectival (like an adjective).

Substantival epithets are formed by adding to the personal name the Latin genitive inflection appropriate to the sex and number of the people being honored. For example, we have *grayi* for Asa Gray (gray + the genitive singular masculine ending, -i), *hookerorum* for the two Hookers, Joseph Dalton and William Jackson (hooker + the genitive plural masculine ending, -orum), and *cloverae* for Elzada Urseba Clover (clover + the genitive singular feminine ending, -ae). This procedure applies for personal names ending in a vowel or in -er.

If the personal name ends in a consonant (excepting -er), substantival epithets are created by adding first to the personal name -i- (a stem augmentation—who knows the reason for this?), then the Latin genitive inflection appropriate to the sex and number of the people being honored. For example, we have *wrightii* for Charles Wright (wright + i (stem augmentation) +

the genitive singular masculine ending, -i), and *eastwoodiae* for Alice Eastwood (eastwood + i (stem augmentation) + the genitive singular feminine ending, -ae).

Occasionally we're fooled when we see an -ae ending, thinking the name must refer to a woman. For example, in *Cylindropuntia kleimiae*, we see all the trappings of a feminine eponymous name—the -i- as the stem augmentation, followed by -ae, the genitive singular feminine ending. We think to ourselves, this must be named after a woman named Klein. It turns out that the epithet *kleimiae* in this case refers to the genus *Kleimia*, which was named after Jacob Theodore Klein.

Adjectival epithets are formed in much the same way, except we add the adjectival endings (-anus, -ana, -anum) rather than the genitive endings, and these endings must agree in gender with the generic name (which is always in the nominative singular). Thus, we have *Astragalus emoryanus* for William Hemsley Emory (emory + the masculine adjectival ending, -anus), and *Corydalis caseana* for Eliphalet Lewis Case (case + the feminine adjectival ending, -ana). This procedure applies for personal names ending in a vowel.

If the personal name ends in a consonant (including -er), adjectival epithets are created by adding -i- (a stem augmentation), plus the adjectival ending that agrees with the gender of the generic name. Thus, for Augustus Fendler we have *Cyperus fendleriannus* (fendler + i + masculine adjectival ending, -anus), *Aristida fendleriana* (fendler + i + feminine adjectival ending, -ana), and *Eriogonum fendlerianum* (fendler + i + neuter adjectival ending, -anum).

Botany is the natural science that transmits the knowledge of plants.

— Linnaeus



The Genus *Nama* in New Mexico

Robert C. Sivinski

Energy, Minerals and Natural Resources Department - Forestry Division
P.O. Box 1948, Santa Fe, New Mexico 87504

The genus *Nama* is traditionally placed in the Hydrophyllaceae, which is a plant family that has recently come under scrutiny for inclusion within the Boraginaceae (APG 2003). *Nama* is represented in New Mexico by only six species, but includes one of our most showy desert annuals (*Nama hispidum*) and a very strange-looking gypsum plant (*Nama carnosum*). *Nama* is Greek for fountain, spring or stream. The significance of that meaning to this group of plants is not apparent. The vernacular name 'fiddleleaf' has been applied to many *Nama* species, but is not morphologically descriptive or accurate for any of the New Mexican species and is nonsensical.

Nama in New Mexico

- 1 Plants with evident woody bases
 - 2 Stems one or a few from the base, branching above the middle; leaves linear, strongly revolute, 1-3 cm long; flowers crowded in terminal cymes at the branch ends; corolla white; seeds brown... *N. carnosum*
 - 2 Stems numerous, freely branching from the woody crown; leaves narrowly oblanceolate, weakly to moderately revolute, 5-12 mm long; flowers solitary along stems or in small terminal clusters, corolla pale bluish pink; seeds yellow... *N. xylopodum*
- 1 Plants without evident woody bases
 - 3 Stem initially single and simple then repeatedly dichotomously branched, erect or upright ascending... *N. dichotomum*
 - 3 Stems not dichotomously branched, freely branching from the base and above, clumped-ascending or decumbent
 - 4 Stem pubescence with numerous short, retrorse hairs and fewer longer, spreading hairs; corollas inconspicuous among the leaves... *N. retrorsum*
 - 4 Stem pubescence variously hispid, strigose or strigulose, but none retrorse; corollas showy
 - 5 Leaves 1.5-6 mm wide, margins revolute - often strongly so, variously linear-oblanceolate, oblong or spatulate with blunt tips; calyx pubescence with at least some spreading hairs... *N. hispidum*
 - 5 Leaves > 2 mm wide, margins not revolute or weakly revolute, linear-lanceolate with acute tips; calyx pubescence entirely strigose... *N. stevensii*

The following distribution maps of *Nama* in New Mexico are of specimens at UNM, NMC, NMCR, ASU and from collections cited by Bacon (1984) and Hitchcock (1933, 1933b). Collection details for most locations may be accessed at the New Mexico Biodiversity Collections Consortium website at <http://nmbiodiversity.org>. Chromosome numbers are from Bacon (1984).

Nama carnosum (Wooton) C.L. Hitchcock (Latin *carnosum* = notably fleshy, possibly for its thickened leaves and flowers). Sand fiddleleaf.

Confined to gypsum substrates in desert scrub ranging from the Tularosa Basin and Yeso Formation outcrops in the south-central part of the state, then into the gypsum outcrops of the Pecos River Basin in the southeast and as far north as Guadalupe County (Figure 1). Flowers June to September depending on precipitation frequency. $n=7$. [*N. stenophyllum* A. Gray ex Hemsley var. *egenum* Macbride].

This is our most distinctive *Nama* species. The combination of perennial habit; relatively long, linear leaves; upright stems that are simple below and branched into dense terminal cymes above the middle; and white flowers distinguish it from other species. A more appropriate common name would be 'gypsum fiddleleaf'.

Nama dichotomum (Ruiz & Pavon) Choisy var. *dichotomum* (Latin *dicotomia* = dividing in two, for the repeated stem division). Wishbone fiddleleaf.

Occurs on a variety of sandy substrates and usually associated with mountain ranges in the western two-thirds of the state (Figure 1). Often a plant of piñon-juniper-oak woodlands and savannas, but may also occur at higher elevations on the thin soils of rock outcrops in subalpine forest, such as Sandia Crest in Bernalillo County and Hermit Peak in San Miguel County. Flowers late July through September. $n=14$. [*N. angustifolium* (A. Gray) A. Nelson; *N. tenue* (Wooton & Standley) Tidestrom]

This late summer annual is readily distinguished by its erect stems that repeatedly and dichotomously divide into wiry branches. Small, depauperate individuals may have only a short, simple stem. Normal branched individuals usually have flowers in even the lowest branch axils making the entire above-ground plant a cymose dichasium that branches indeterminately until the plant dies. Corollas are relatively small, 4-6 mm long, and can be pale pink-violet, pink or white.

Nama hispidum A. Gray var. *hispidum* (Latin *hispidus* = bristly, for the stiff hairs on the calyx). Sandbells, bristly nama.

Sandy and coarse gravelly soils in arid shrub land and grassland, occasionally at elevations as high as piñon-juniper woodland. Distributed nearly state-wide at lower elevations. Frequently collected in the middle and lower Rio Grande Basin, but under-collected in some areas such as northeastern New Mexico (Figure 2). Schiebout (2006) reports this species for Colfax, Quay and San Miguel counties. Flowers in spring or summer, and may bloom all summer during favorable years. $n=7$. [*Marilaunidium foliosum* Wooton & Standley; *N. hispidum* var. *mentzelii* Brand; *N. hispidum* var. *spatulatum* (Torrey) C.L. Hitchcock]

Usually an annual, but may overwinter as a rosette of leaves, then flower in the spring. This is the most common and variable *Nama* species in our flora. A few of the named varieties seem worthy of taxonomic recognition, however, their character states can become recombined in other populations making the

(Continued on page 5, *Nama*)



(*Nama*, continued from page 4)

New Mexican circumscriptions of infraspecific taxa impractical. Most New Mexico populations have ascending stems; narrow, strongly revolute leaves; and medium pink-violet (purple) corolla limbs that are usually 5-8 mm wide (sometimes to 10 mm wide). A variation in Chaves, Eddy and Lincoln counties is noteworthy for its relatively broad elliptic or spatulate stem leaves that are only weakly revolute on the margins. The type specimen of *Marilaunidium foliosum* came from this form.

Another unusual variant are the plants with decumbent stems in Hidalgo County, which can be seen on the sandy margins of the Hachita Playa. These have relatively large 10 mm wide corolla limbs that initially emerge as dark purple, quickly fade to medium purple, and finally to a pale pink that is almost white. The tri-colored mounds produced by all three flower colors occurring on each plant present an unusual floral display for this species. This population needs further study and comparison with *N. hispidum* variants in Sonora.

Nama retrorsum J.T. Howell (Latin *retrorsus* = bent backward or downward, for the small retrorse hairs on the stem). Betatakin fiddleleaf.

Northwestern quadrant of the state (Figure 3) on deep sands of arroyos or stable dunes in desert scrub or piñon-juniper woodland. This plant occurs in widely scattered populations and is infrequently collected in New Mexico. Flowers from June to October during years of favorable precipitation. n=7.

Summer annual that flowers until autumn when rainfall is favorable. The earliest flowers are small and inconspicuous among the leaves. Autumn flowers on the same plants are somewhat larger and more conspicuous. Corolla color is medium to dark purple.

Nama stevensii C.L. Hitchcock var. *stevensii* (for George Walter Stevens [1868-1936], biology teacher and Director of the 1913 Oklahoma Botanical Survey). Stevens' fiddleleaf.

Southeastern quadrant of the State (Figure 3) on sandy gypsum substrates in the desert scrub and arid grasslands of the Pecos River basin. This plant occurs in widely scattered populations and is infrequently collected in New Mexico. Flowers spring and summer. n=7.

Annual or short-lived perennial plants that do not develop a woody crown or caudex. Very similar to *N. hispidum*, but distinguished by its strigose calyx and narrow, acute leaves that are weakly revolute. Corolla is medium purple and showy, but not as broad as some of the large-flowered variants of *N. hispidum*.

Nama xylopodum (Wooton & Standley) C.L. Hitchcock (Greek *xylos* = woody and *pous* = foot, for the woody crown of this perennial plant). Yellow-seed fiddleleaf.

Narrowly endemic to the Guadalupe Mountains of Eddy and Otero counties, New Mexico and adjacent Texas, and Sierra Diablo in Culberson County, Texas (Figure 3). Crevices in limestone cliffs and outcrops from desert scrub up to ponderosa pine forest. Flowers spring to autumn. n=7. [*Marilaunidium xylopodum* Wooton & Standley]

This is the only New Mexico *Nama* that is a long-lived perennial and confined to limestone cliffs. Its range of distribu-

tion is small, but it is quite abundant in suitable habitats.

Nama torynophyllum Greenman has been collected on the creosote bajada west of the Franklin Mountains in El Paso County, Texas about 8 miles south of the New Mexico border (*R.D. Worthington s.n.*, 21 Sep 2006, ASU). Botanists in adjacent Doña Ana County, New Mexico should look for this plant in similar habitat. It is a mat-forming annual distinguished by its spoon-shaped leaves that are petiolate, or nearly so, then rounded distally.

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Figure 1. New Mexico distribution of *Nama carnosum* (stars) and *Nama dichotomum* (triangles).

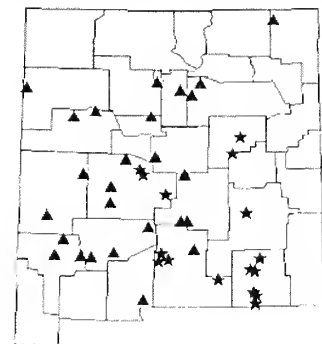
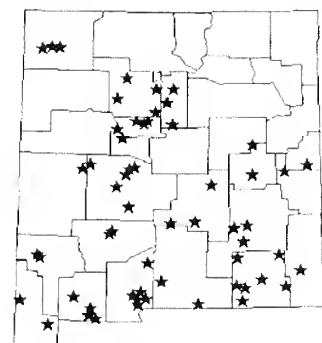


Figure 2. New Mexico distribution of *Nama hispidum*.

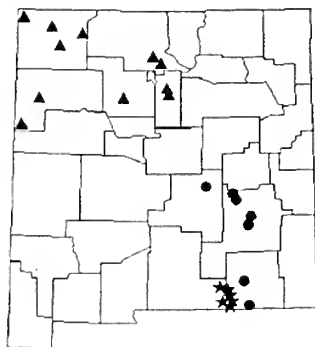


(Continued on page 6, *Nama*)



(*Nama*, continued from page 5)

Figure 3. New Mexico distribution of *Nama retrorsum* (triangles), *Nama stevensii* (circles), and *Nama xylopodium* (stars).



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Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Jayne Mygatt [Museum of Southwestern Biology, MSC03 2020, 1 University of New Mexico, Albuquerque, NM, USA 87131-0001]

Carex tahoensis Smiley (Cyperaceae, Tahoe sedge): Taos County: Carson National Forest / Valle Vidal, Ash Mountain quadrangle, SW quarter, W 35 45'30" N 105 14'45", Valle Vidal Basin, 1 Oct 1983, Janet Williams 15 (UNM), Det. B.E. Nelson, Univ. Wyoming (RM).

— Ken Heil [San Juan College, 4601 College Blvd., Farmington, NM 87402]

****Crypsis alopecuroides*** (Piller & Mitterpacher) Schrader (Poaceae, pricklegass): McKinley County: Bluewater Lake State Park, northeast bank of the lake, N35° 18.305' W108° 07.8974', one of the dominant grasses along lake margin, with *Xanthium strumarium*, *Gnaphalium*, & *Eragrostis*, 7395 ft, 9 Sep 2008, Ken Heil 29896 & Wayne Mietty (SJNM).

Platanthera obtusata (Banks ex Pursh) Lindley (Orchidaceae, one-leaf bog-orchid): Mora County: Pecos Wilderness, about 300 feet above Rito Maestas Creek, N35° 57.068' W105° 34.840', damp forest with *Luzula*, *Dodecatheon*, *Listera cordata*, *Picea engelmannii*, growing along rotting log, 10990 ft, 9 July 2008 Ken Heil 29554 & Steve O'Kane & Wayne Mietty (SJNM).

Draba smithii Gilg ex O.E. Schulz (Brassicaceae, Smith's whitlow-grass): Taos County, ca. 5 mi northeast of Pilar on State Hwy 68, at hairpin curve, two track leading up Hondo Canyon, ca 0.1 mi from highway along banks of intermittent stream, N36° 18.025' W105° 43.964', with *Vitis*

arizonica, Gambel oak, 6890 ft, 24 May 2008, Ken Heil 29,312A and Steve O'Kane (SJNM). [Previously known only from Colorado]

— Jack Carter [P. O. Box 1244, Silver City, NM 88062]

Ageratina lemmonii (B. L. Robinson) R. M. King & H. Robinson (Asteraceae, Lemmon's snakeroot): Catron County: Locally common perennial to 50 cm in height; flowers white; adjacent to Indian Creek road, 0.4 miles from junction with FS 153; montane coniferous forest, Gila National Forest. Section: 31, TW: 10S, RG: 17W, Elevation 8,845 ft., 9 August 1994, Sheila L. Christy and Charles Huff s.n. (NMC).

— Schiebout et al. (see Botanical Literature of Interest)

Rorippa teres (Michaux) Stuckey (Brassicaceae, southern marsh yellow-cress): Mora County.

Chenopodium berlandieri Moquin-Tandon var. *berlandieri* (Chenopodiaceae, pitted goosefoot): Union County.

Artemisia ludoviciana Nuttall var. *incompta* (Nuttall) Cronquist (Asteraceae, wormwood): Colfax, Harding, Mora, San Miguel, Union counties.

Tetraneuris torreyana (Nuttall) Greene (Asteraceae, rubberweed): Harding & San Miguel counties. [This is a second report for the state, the first being by Wootton & Standley as *T. depressa*]

****Rosa x harisonii*** Rivers (Rosaceae, Harison's rose): Colfax County.



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A Newsletter for the flora of New Mexico, from the Range Science Herbarium and Cooperative Extension Service, College of Agriculture and Home Economics, New Mexico State University.

In This Issue —

- Gregg in NM 1
- Plant Distribution Reports..... 7
- Botanical Literature... 7
- What's in a Name 7

Mariner on a Dusty Sea: Josiah Gregg

Gene Jercinovic

6285 Algodón Rd. SW, Deming, NM 88030

The wagon train contained nearly 100 wagons carrying more than 200 men accompanied by perhaps a dozen smaller vehicles, dearborns and the like, and a couple of cannons. It had been almost ten weeks since it had departed from Independence, Missouri, and now in the heat of late July the journey's end was not far distant. A group of ten or twelve horsemen rode out well ahead of the main party, impatient to arrive and to announce the proximity of the traders and their goods to those at their destination. One of the horsemen recorded the event:

Ascending a table-ridge, we spied in an extended valley to the northwest occasional groups of trees skirted with verdant corn and wheat fields, with here and there a square block-like protuberance reared in the midst. A little farther and just ahead of us to the north irregular clusters of the same opened to our view.

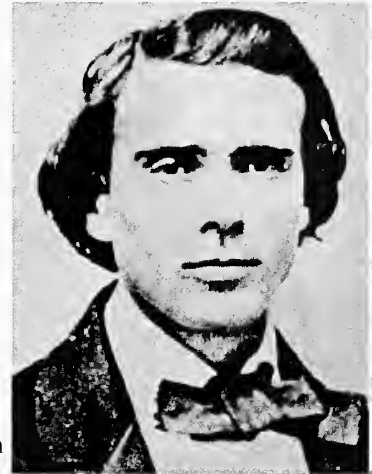
"Oh, we are approaching the suburbs!" thought I, on perceiving the cornfields and what I supposed to be brick-kilns scattered in every direction. These and other observations of the same nature becoming audible, a friend at my elbow said, "It is true those are heaps of unburnt bricks, nevertheless they are houses — this is the city of Santa Fé."

Josiah Gregg, the narrator, was on his first journey from Independence to Santa Fé. The year was 1831. He would cross the untamed prairie seven more times in the next nine years.

The Gregg family moved from Ireland to Pennsylvania in 1682. Josiah's father, Harmon was born there in 1774. Near the end of the eighteenth century the family moved to North Carolina. By that time, Harmon had married. In the early 1800's Harmon and his family moved to Tennessee. Josiah was born there in Overton County, the fifth of eight children. The family moved to Illinois and then, by the beginning of the War of 1812, had relocated to Cooper's Fort in Missouri, in Howard County, near the Missouri River. It was here that Josiah was raised, at the edge of settled country, with a vast frontier to the west. Self-reliance was central and there were perils to test the measure of determination. When Josiah was eight, marauding Indians killed his uncle and kidnapped his young cousin Patsy. She was soon recovered, but the precariousness of frontier existence and the courage to confront it were built into every soul.

Josiah was not a strapping and burly farm boy, but a somewhat delicate lad who did what he could in spite of not infrequent bouts of sickness. He did gain portions of his father's self-sufficiency and ingenuity, which would benefit him in his own times on the prairie. Josiah was of a more studious mien, reading everything he could find. He had a quick facility with numbers and their manipulation. He had a careful eye. There was a school of sorts at Cooper's Fort and Josiah absorbed all it had to offer. Students would seek help from him as often as from the "teacher". Before his teens he built a wooden quadrant that he could use to measure the heights of trees, much to the disbelief of other children. When he was sixteen he began the study of

(Continued on page 2, Gregg)



Botanice est Scientia Naturalis quae Vegetabilium cognitioem tradit.

— Linnaeus



(Gregg, continued from page 1)

surveying with his brother John. When he was eighteen, he went to Liberty at the western edge of the territory where he founded a school and taught for a year.

By the early 1820's trading expeditions to Santa Fé had begun. In 1822, Harmon Gregg was a member of the Becknell party, one of the earliest to reach Santa Fé. In 1824, Josiah's older brother Jacob was one of eighty men in twenty-five wagons bringing \$30,000 worth of goods across the prairie. The allure of the prairie had quietly woven itself into the Gregg fabric. In 1825, the Gregg family uprooted and resettled about a hundred miles west in Jackson County not far from where the town of Independence would be founded in 1827. Both in 1825 and 1826 Josiah's brother John made the trek to Santa Fé. Meanwhile, Josiah was trying to determine a suitable profession for the application of his mixture of talents. First he considered medicine, applying for an apprenticeship with a noted doctor in Saline County, about fifty miles east, but was declined. So he decided to study the law.

His study proceeded with some diligence but without passion. He informed his brother "law was the only study he had ever undertaken, in which he did not think he had been able to make reasonable progress." In 1830 he began to have significant problems with his health. By autumn he was bedridden where he remained through the winter. In the spring of 1831 his doctor suggested a strange remedy, but one making reasonable sense to the Gregg Family, a trip across the prairie. So Josiah and a few belongings were loaded onto a wagon headed for Santa Fé. For the first few days, all he could do was lie in the wagon, but he filled his time by studying Spanish. After a week he was able to ride his horse for part of the day. His strength grew and his health began to return. By July he was fully a member of the expedition and riding with the advance party into Santa Fé. On that horse he had found his calling.

Josiah did not return to Independence until the fall of 1833. He had gained an excellent command the Spanish language and a feel for the customs and people of New Mexico. By the spring of 1834 he had arranged credit and filled his wagons with merchandise to make another trek to Santa Fé. In the spring of 1835 after selling his goods, he decided to journey to the Mexican city of Chihuahua, five hundred miles to the south to purchase Mexican textiles. Once there he decided to explore further and set out for Durango, then Zacatecas, and on to Aguascalientes, deep in Mexico. He returned to Santa Fé early in 1836 and to Independence that fall. The spring of 1837 saw him once again on the trail to Santa Fé. Again in 1837 there was another trip to Chihuahua and in the Spring of 1838 the return to Independence. And in the April of 1839, once more he set out across the prairie, this time from Van Buren, Arkansas, with his brother John and a dozen others. They took a new route, paralleling the Canadian River just north of the Llano Estacado. From Santa Fé Josiah again made the trip to Chihuahua and back. The group headed east from Santa Fé in February 1840 and were back at Van Buren by late April. Josiah would not see Santa Fé again. His nine years on the prairie would never be forgotten. He had carefully kept a daily journal of the entire period.

Josiah returned to the family farm near Independence

shortly thereafter where he remained until the summer of 1841. That summer he and his brother John decided to take a trip to Texas to sell mules and see the country. They returned to John's property on October 26. On the 29th Josiah purchased 640 acres in Sabine Parish, Louisiana. He left the area again in early November, feeling that he had not seen enough of Texas. He rode to Houston and by the middle of the month to Galveston. In early December he went on to Austin where he attended the inauguration of Sam Houston as President of Texas on December 13th. He recorded in his journal: "Gen. Houston was elected by a heavy majority, and now seems the favorite of the people: but I fear this will be found to speak badly of the judgment and morals of his constituents. His morals and honest character, and general deportment through life will not, I fear, justify the favor he now seems to enjoy." He left soon afterward and was back in Arkansas by mid-January of 1842.

Josiah spent the year of 1842 staying with his brother in Van Buren. He was hired to survey the city. He worked off and on, completing the job late in the year. He also went into partnership with his brother and a man named George Pickett, establishing a store. As the year drew to a close he determined it was time to write a book about life on the prairie based on his journals. By June of 1843 he had started to work in earnest and decided to travel to Philadelphia in order to devote all of his time to the project and to the task of finding a publisher. He worked for months in the Philadelphia and Camden, New Jersey area. By late November he was nearly finished and went to New York to seek a publisher. The memoir, *The Commerce of the Prairies*, was published in June 1844. His book would see six editions and was even translated into German. Somehow the once sickly half-Irish lad had triumphed over it all.

John Gregg had moved to the vicinity of Shreveport, Louisiana. Josiah arrived there in late July with a hundred copies of the book. Shortly thereafter his father died. Over the next few months his immersion in civilization began to weigh on him. In October he wrote to John Bigelow, a friend in New York who had helped him with the publishing of the book: "My organ of 'inhabitiveness' is, I believe, entirely annihilated, and my desire to be on the 'wild roam' continues to increase." But rapid book sales demanded his return to New York where he prepared for a second edition and wrote a new preface. He was back at Shreveport by February 1845. After several months of tending to his mercantile interests in Arkansas and visiting in Missouri and Louisiana he settled on the idea of attending medical lectures at the Louisville Medical Institute in Kentucky (later part of the University of Louisville).

He arrived in Louisville in early November. His course of study required six hourlong lectures per day. Despite a few problems with his health, he pursued his medical education with dedication. He was impressed and pleased with the professors. He developed a particularly warm relationship with the "demonstrator of anatomy", Charles Wilkins Short. Short was the successor of the infamous Constantine Samuel Rafinesque at Transylvania University in Lexington. In 1838 Short and several others founded the Louisville Medical Institute. It

(Continued on page 3, Gregg)



(Gregg, continued from page 2)

is likely that Short, who was very interested in botany, piqued Josiah's interest in plants. During 1845, probably prior to his time in Louisville, Josiah made the acquaintance of two other physicians in St. Louis, George Engelmann and Frederick Adolph Wislizenus who also stimulated his interest in natural science. Josiah became a Doctor of Medicine on March 9, 1846.

By this time Josiah had become restless and was strongly feeling a need to return to his prairie life. He had summarized the situation in the last few pages of *The Commerce of the Prairies*:

Since that time I have striven in vain to reconcile myself to the even tenor of civilized life in the United States; and have sought in its amusements and its society a substitute for those high excitements which have attached me so strongly to prairie life. Yet I am almost ashamed to confess that scarcely a day passes without my experiencing a pang of regret that I am not now roving at large upon those western plains. Nor do I find my taste peculiar; for I have hardly known a man who has ever become familiar with the kind of life which I have led for so many years, that has not relinquished it with regret... It will hardly be a matter of surprise then, when I add that this passion for prairie life, how paradoxical soever [sic] it may seem, will be very apt to lead me upon the plains again, to spread my bed with the mustang and the buffalo under the broad canopy of heaven – there to seek to maintain undisturbed my confidence in men by fraternizing with the little prairie dogs and wild colts and the still wilder Indians – the *unconquered Sabaeans* of the Great American Deserts.

Col. G. C. Owens was organizing a trip to Santa Fé out of Independence. Josiah needed to shake free from his societal disguise and signed on. His departure was delayed by an outbreak of scarlet fever in his brother-in-law's family, but he sent his belongings with the expedition. On June 10, 1846 in a letter to George Engelmann he wrote:

I received the articles which you were so kind to procure for me by Dr. Wislizenus – all complete and in good condition – and I know not how sufficiently to express my obligations to you for your attentions – and very especially for the most valuable memoranda with which you have furnished me. I can only hope to be able hereafter – not to repay you in equally valuable favors but to reciprocate in at

least an insignificant degree, by forwarding to you such specimens – as well zoological as vegetable and fossile – as I may suppose interesting to you.

On the 13th he mounted his horse and rode out to overtake the wagons.

That same month war had broken out between the United States and Mexico. Before Josiah left Independence he had been asked to accompany the Arkansas Regiment of the U.S. Army to Mexico, but he felt that his role was not clearly defined and chose to head to Santa Fé. After a few days on the trail, he received correspondence from the U.S. Senator from Arkansas imploring him to accept the mission. He rode back to Independence with only as much as he could carry on his horse. On the 22nd he rode to Shreveport to join the Arkansas Volunteers. On the 24th they were on their way to San Antonio, Texas, where they arrived on August 28. The army of about 3000 men under Gen. John W. Wool left San Antonio on September 26 and crossed the Rio Grande into Mexico at Presidio on October 9. The march into Mexico was mostly unopposed. In fact the army was treated with decency and a spirit of cooperation by the Mexican citizenry. "The Chihuahuan Army", however, was often less cordial, stealing animals and food supplies, even destroying houses for firewood. Josiah was outraged at such behavior, and ever more so at the tacit acceptance displayed by commanding officers. At the same time, he was still quite uncertain of what his role was in the campaign. By mid-December the army had arrived at Parras, 90 miles east of Saltillo, where they settled in awaiting further orders.

During the month of January 1847, and early February Josiah spent his time traveling about the area between Saltillo and Monterey collecting plants. In a February 10th letter to Engelmann he wrote:

In Botany, I had done nothing until lately – until the last two months or less. Having sent my "portfolio" and drying paper across the Prairies to Santa Fé, I have been unable to procure any suitable paper until I chanced to find at Saltillo an abundance of pretty fair quality. Since that, I have collected from Saltillo here (rather to my surprise, at this very unfavorable season) nearly two hundred varieties of plants – half or three-fourths of which were in flower. I flatter myself with the hope that at least a few dozen of these may prove new, and a chance one interesting to you; if so, I shall feel amply rewarded for the little pains I have been at: for I have ventured to put you up a small "book" with nearly a hundred species, I think – though I in my very great hurry I did not count them. These I send in care of Professor Short, of Louisville,

(Continued on page 4, Gregg)

Botany is the natural science that transmits the knowledge of plants.

— Linnaeus



(Gregg, continued from page 3)

as I have met with a friend of confidence going directly to that place... I doubt not you will frequently find the same plants twice or thrice inserted, as I had not the leisure to pack them with sufficient care. I doubt not also, that you will consider them very badly "handled"; yet I hope the fact of this being my first attempt at practical botany will serve as an apology. I think I shall be able to do something better in the future. And now that I have embarked in it, and contracted a decided interest in the collection of plants, I trust I shall be able in the course of the ensuing spring and summer, to send you several hundred specimens – many new and some interesting.

Josiah's botanical activities were interrupted by the appearance of the Mexican army under Santa Anna a few miles south of Saltillo in the third week of February. On February 22nd the Battle of Buenavista began. By the morning of the 24th the Mexican forces were in retreat. The Mexicans lost more than a thousand men, the Americans several hundred, but hostilities in the area were over. Josiah gathered more plants during March and wrote Engelmann on the 25th that more specimens were on the way along with some for Professor Short.

On April 2nd a small contingent of soldiers arrived from Chihuahua and announced Col. Doniphan's triumph over Mexican forces there. Josiah learned that Col. Owens and the group that was on its way to Santa Fé had joined Doniphan's army and were in Chihuahua. Josiah had certainly had enough of his immersion in army life and returned with the small group of soldiers to Chihuahua, collecting plants along the way. They arrived in Chihuahua April 23. There he met up with Dr. Wislizenus who had journeyed to Santa Fé and Chihuahua with traders in May and June of 1846. Wislizenus was taken prisoner at Chihuahua when the war began. He was not incarcerated, but was not allowed to leave the area. Wislizenus used his time to collect plant specimens for Engelmann. The two doctors were glad to see each other again. Josiah was able to reclaim his wagon and belongings which had arrived with the Owens group. Doniphan's regiment was returning to the U.S. They left Chihuahua on April 28 for Saltillo accompanied by the two doctors. When they arrived, Josiah received correspondence from a trader who offered to finance a buying trip to New York. Josiah decided to seize the opportunity. The group proceeded through Monterey and on to Matamoros. All the while the two doctors gathered plant specimens.

Josiah arrived at New Orleans on June 13 and, after traveling through Philadelphia and Washington D.C., at New York on July 12. There he received "a telegraphic dispatch" from the trader informing him that the expedition was canceled. He decided that he wanted to return to Mexico, possibly in some capacity with the U.S. government. He returned to Washington to see what he could arrange. On July 30 he visited President Polk. Josiah was quite disappointed: "It is remarkable that a man so short of intellect should have been placed in the executive chair!" He decided to have no more involvement with the

government and to return to Saltillo to practice medicine. From Louisville on August 13th he mailed a package of Mexican specimens and wrote a long letter to Engelmann. It began: "You must allow me to apologize again for my delay in sending the collections, etc. which I have so long promised you." In the letter he explains the curious symbol code he used to describe "size and abundance of the plants." Engelmann later summarized the value of the collections of the two doctors in his *Memoir of a Tour to Northern Mexico*:

In examining the collections of Dr. Wislizenus, I have been materially aided by having it in my power to compare the plants which Dr. Josiah Gregg, the author of that interesting work, "The Commerce of the Prairies," has gathered between Chihuahua and the mouth of the Rio Grande, but particularly about Monterey and Saltillo. And a share of which, with great liberality, he has communicated to me. His and Dr. W's collections together, form a very fine herbarium for those regions.

Josiah was unable to extricate himself from the country until November 28 when he boarded a steamer at New Orleans.

He arrived in Saltillo on January 4, 1848. On the 24th he wrote Engelmann describing his traveling difficulties and commenting: "As to botany, I have done virtually nothing yet: the month of December was unusually cold, so that, from Matamoros here, vegetation was pretty much frost-bitten... I shall therefore leave this subject – as well as other branches of natural history – to some future communication, for I have done little else as yet but endeavor to get myself to rights in my new domicile – barring a little attention to medical practice, into which I have been drawn by the Mexicans." By May his medical practice was well established and he was tending to the sick day and night. On May 15th he wrote his brother John: "I made a rough estimate of my practice for the month of April. It amounted to between four and five hundred dollars. This month will doubtless be more." He had become a respected and revered citizen of Saltillo. During the summer he began to take small trips around the area hunting plants, and by autumn he was making more frequent and more extensive forays, but as the year drew to a close he found himself again with a yearning to roam.

On the 14th of December he joined "a distinguished party of Saltillonses" leaving on a trip to Mexico City. The group consisted of 8 men and 3 women, but with servants the number reached about 30. They arrived in Mexico City on January 8, 1849. Josiah spent the rest of the month "looking at the city and surrounding country." On the 1st of February he wrote Engelmann:

When I left Saltillo, I had not my future route fully planned out; I have, ever since entering Mexico last time, contemplated a

(Continued on page 5, Gregg)



(Gregg, continued from page 4)

tour upon the Pacific Coast, as far north as California, and perhaps Oregon: and now that so much is said about the mines of California, I have added inducement to go that way. I have therefore *about determined* – if not positively determined – to leave here toward first of March for the Pacific Coast, via Morelia, Guadalajara, etc. to Mazatlan... I shall send you (via Vera Cruz) before leaving this place, my entire botanical collections, etc. not very extensive, to be sure, as I was most of the time at Saltillo, whose vicinity I had examined pretty well before. Still – all in all – including duplicates of many sent you before – I suppose I must have nearly as many species as I sent you before. These all will go numbered, keeping a memorandum of them myself.

Josiah did not meet his March deadline, unable to pull himself away from the culture, architecture, and endless unseen landscapes of the area. On the 14th of April he again wrote Engelmann:

I have now put up to send you from here some 700 specimens, including all my collections since I last entered Mexico. Among these I purposely [sic] embraced a great number of those I had already sent – many others have doubtless been introduced without my knowing it; nevertheless I think more than half are distinct; and a few I hope new and interesting. I have followed the system of numbering as you directed; but I find it impossible at present to copy my notes; yet I will do it as soon as possible and send you.

By this time Josiah had assembled a group of six men and "a Mexican servant" to accompany him on his trip northward. They left Mexico City on April 26. Traveling slowly, they reached Guadalajara on May 17 and Mazatlán on June 7. There he paused for more sightseeing and a bit of casual collecting. On June 30 he wrote Engelmann and described how he had separated his botanical collections into two sets, one complete and another with duplicates, which he would send separately in case of loss and requested that if Engelmann received both that he forward the duplicate collection to Professor Short in Louisville. This would be his last known communication with Engelmann.

Due to the parched climate and his growing desire to reach California, he abandoned the idea of making the trip on horseback and on July 16 boarded a ship bound for San Francisco. On the 30th of August he described his arrival at the harbor of San Francisco which "resembled those of the large cities of the world, on account of the immense forest of masts which loomed up before us." After reaching San Francisco any records Josiah certainly would have kept were lost, but a general picture of the next six months has emerged.

Always one who enjoyed being in the middle of nowhere,

Josiah made his way by October to a tiny community called Rich Bar on the Trinity River in northern California. It was a rugged area almost 300 miles from San Francisco but only about 80 miles from the Pacific Ocean. A group of men decided to journey westward to the ocean to see if they could locate a suitable bay where ships could bring supplies. On November 5 twenty-four men departed. Josiah was elected leader. The weather was miserable and after a couple of days sixteen men returned to Rich Bar. Josiah and seven other persevered. Food quickly ran out and they were forced to survive on whatever they could find, often going a day or two without food. As they neared the coast they met a redwood forest, a jumble of standing and fallen giants. They could scarcely make two miles a day. Ever the man of science, Josiah wanted to measure heights and girths of trees. The others scoffed and hurled vocal abuse. They reached the sea in the first week of December near the mouth of what is now the Little River. About ten miles north they found a suitable bay (Trinidad Bay). On the 7th of December Josiah carved the latitude, barometric pressure, temperature, the date, and his name into a large tree beside the bay. This tree was observed in the spring of 1850 by a group of explorers who reached the area by ship. The tired, bedraggled men decided to head south to try to reach civilization. After friction as to routes, they broke into two groups. Josiah's group headed inland and turned south. The winter forest was cruel. They had little ammunition and began to starve. Josiah grew weaker and weaker. On February 25, 1850, near Clear Lake, he fell from his horse and died a few hours later. He was buried there and his belongings abandoned.

Josiah Gregg was a classic character of the American western frontier. He represented an important blend of vital forces in the country at the time, the unpolished individualism and indomitable courage of a Daniel Boone explorer and the innocent inquisitiveness and quest for orderliness growing in men of science like Engelmann, John Torrey, and Asa Gray. He went to places now one else would go and found a way to not only survive but to succeed, a champion of both frontiersmanship and careful science. In his description of *Greggia* (now *Nerisyrenia*) *camporum* in *Plantae Wrightianae Texano-Neomexicanae* in 1850, Asa Gray wrote:

Also gathered, some years since, "west of Parras" in Cohahila [sic] and later at Cerros Bravos, by Dr. Josiah Gregg, the author of the "Commerce of the Prairies", and other writings on the physical character, productions, and resources of New Mexico, and who has for several years past been a most diligent explorer and collector of botanical treasures of New and Northern Mexico. Intelligence of his lamented decease, in California (from over-exertion in scientific investigation in the interior) having reached me which engaged in the study of this interesting plant – one of his own discoveries, -- I dedicate the genus to his memory, and give to the species a name that

(Continued on page 6, Gregg)



(Gregg, continued from page 5)

associates it with the plains of the Southwest, which this enterprising discoverer has so largely explored and so ably illustrated.

Josiah's Plants

One hundred sixty years have passed since Josiah Gregg's last plant specimen was gathered. His early botanical efforts were sincere but not scientific. It was George Engelmann who convinced Gregg to number his specimens and to record data, but, even so, Gregg reused numbers and did not assign numbers in the order of collection. The majority of his specimens were sent to Engelmann in St. Louis, but a significant number went to Charles Wilkens Short in Louisville. The Engelmann material is housed at the Missouri Botanical Garden and is databased. The C.W. Short Herbarium was sent to the Smithsonian Institution upon his death and was ultimately placed at the Academy of

Family	Genera	Species	# of specimens
ASTERACEAE	78	143	251
FABACEAE	39	116	215
EUPHORBIACEAE	13	44	74
SOLANACEAE	8	38	65
POACEAE	27	30	43
CACTACEAE	12	27	47
BORAGINACEAE	9	27	41
VERBENACEAE	7	24	62
CONVOLVULACEAE	7	22	44
NYCTAGINACEAE	10	20	35

Natural Sciences in Philadelphia and is not databased.

The Gregg material at Missouri amounts to almost 1900 sheets representing 123 families, 530 genera, and 1020 different species. It provides an excellent view of Gregg's botanical activity. More than one-fourth of the families are represented by a single species. More than one third of the families are represented by a single genus. Almost one half of the different species come from the ten largest families in his collections (see table below).

The genera with the largest number of species are *Solanum* (17), *Chamaesyce* (15), *Tillandsia* (10), *Opuntia* (10), *Acacia* (10), *Euphorbia* (10), *Heliotropium* (9), *Physalis* (9), *Verbena* (9), *Asclepias* (9), *Nama* (8), and *Salvia* (8).

Since Gregg was one of the first to collect deep in Mexico, a number of his specimens are vitally important. The Missouri Botanical Garden credits him with 89 type specimens in 24 families. The New York Botanical Garden shows 70 Gregg specimens specifically designated as some form of type (type, holo-, syn-, lecto-, isosyn-, etc.) in 28 families. Since the NYBG was founded in 1891, the presence of these types suggests a wider dispersal of Gregg's collections. Certainly other herbaria are involved. 42 of the New York specimens are *sine numero* (none *s.n.* among types at Missouri). 17 of the sheets carry the same

date and specimen number as a sheet at Missouri. The Academy of Natural Sciences lists but one type from Gregg, a lectotype of *Drejera* (*Anisacanthus*) *greggii* numbered 587 which matches the number and date of a lectotype at NYBG. It is interesting to note that among all specimens mentioned above (general collection and types at MO, types at NY and PH), the earliest collection date mentioned was 26 December 1846, by which time he was in the vicinity of Saltillo, far into Mexico. There is no record of plant specimens ever being collected in New Mexico.

Attempts to name a genus for Gregg have been made (*Greggia* Engelmann = *Cowania*, *Greggia* A. Gray = *Nerisyrenia*), but none has survived. Roughly 80 species epithets have been generated to honor Gregg, but taxonomic revisions have eliminated more than half (see <http://www.csupomona.edu/~larryblakely/whoname/greggiis.htm> for a 2004 summary). In 2009, eleven taxa in New Mexico still carry Gregg's legacy:

Acacia greggii Gray var. *arizonica* Isely (FABACEAE)
Acacia greggii Gray var. *greggii* (FABACEAE)
Ceanothus greggii Gray var. *greggii* (RHAMNACEAE)
Dalea greggii Gray (FABACEAE)
Fraxinus greggii Gray (OLEACEAE)
Haploesthes greggii Ray var. *texana* (Coulter) I.M. Johnson (ASTERACEAE)
Heliotropium greggii Torrey (HELIOTROPACEAE)
Peniocereus greggii (Engelmann) Britton & Rose var. *greggii* (CACTACEAE)
Silene laciniata Cavanilles var. *greggii* (Gray) C.L. Hitchcock & Maguire (CARYOPHYLLACEAE)
Thymophylla setifolia Lagasca var. *greggii* (Gray) Strother (ASTERACEAE)
Tiquilia greggii (Torrey) A. Richardson (BORAGINACEAE)

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- Virtual Herbarium MO. <http://www.tropicos.org/SpecimenSearch.aspx>
- Virtual Herbarium NY. <http://sciweb.nybg.org/science2/hcol/allvasc/index.asp>
- Virtual Herbarium GH. <http://asaweb.huh.harvard.edu:8080/databases/publications?id=605>



Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Jim McGrath [20 Robin Court, Edgewood, NM 87915]

**Potentilla recta* Linnaeus (Rosaceae, sulphur cinquefoil):

San Miguel County: floodplain of Manuelitas Creek, about 6.5 miles northwest of Sapello, in weed-dominated meadow, 7300 ft, 15 Sept 2006, Jim McGrath 728 (UNM). [This is the first report of this invasive species for New Mexico.]

**Pseudognaphalium luteoalbum* (Linnaeus) Hilliard & Burt

(Asteraceae, Jersey rabbit-tobacco): San Miguel County: Singleton Ranch, about 0.9 miles west of San Miguel – Quay County line and 0.9 miles due west of NW/4sec. 27, T13N, R31E; edge of small *Schoenoplectus pungens*-dominated wetland in bottom of depression in shrubby grassland, 3850 ft, 7 June 2008, Jim McGrath 820 (UNM). [This is the second report of this species in NM, the first being from Hidalgo County.]

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What's In A Name?

From time to time we have run in this newsletter little biographies of New Mexico botanists, such as Charles Wright (number 22), A.L. Hershey (number 23), John Bigelow (number 26), W.A. Archer (number 33), and George Suckley (number 36). In addition, most of us are aware of some of the more notable botanical luminaries, such as E.O. Wootton and Paul C. Standley. There remains, however, a little-known New Mexico botanist who made tremendous contributions to the knowledge of our fair state's flora, in spite of being in the Land of Enchantment for an extremely short period of time.

Loof Lirpa was born of a Czech father (Duben Hlupák Lirpa) and a Hungarian mother (Inga Maloof) in the tiny burg of Tászládány, Hungary, about 1910. One can surmise that Lirpa's given name derives from his mother's family name, Maloof; perhaps it was a nickname. Political unrest and a floundering economy drove the family from Europe to the United States, where his father found employment as the "delivery boy" for a florist shop in the Bronx. It is here that Loof found his interest sparked in things botanical and biological. Family friends remember his early desires to have a garden and to collect specimens of the local flora, as well as a troublesome obsession with sponges, which he found in the bays and estuaries near the Bronx. Details of his education and growing-up are unknown, but we find him in 1937 in the employ of a medical company, hired to search for rare plants of potential pharmaceutical value. It is presumably during this period that he spent time in Iowa cataloging their natural curiosities; the Loof Wildlife Management Area in Osceola County signals his activities there. Eventually he made his way to New Mexico, and it was while foraging along the banks of the Rio Grande for rare aquatic plants, that Lirpa came across what has come to be known as Lirpa's spring minnow-wort. This botanical anomaly produces a single underwater flower once each year, on a single day in the spring of the year. Numerous attempts to locate it at other times have been unsuccessful, though we now know that it occurs in numerous waters throughout the state, being particularly common around Santa Fe and in the aquatic gardens at The Round House. A related species is common in France, known as Poisson d'Avril (contrary to our species, the French species flowers throughout the year). Lirpa's spring minnow-wort is in the *Fatouaceae* family, and, because of its spring-flowering, belongs to the genus *Aprilis*. The species discovered by Loof Lirpa carries the name, *Aprilis stultis*.





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A Newsletter for the flora of New Mexico, from the Range Science Herbarium and Cooperative Extension Service, College of Agricultural, Consumer, and Environmental Sciences, New Mexico State University.

In This Issue —

- *Mentzelia* in New Mexico..... 1 ✓
- *Heuchera* in New Mexico..... 5 ✓
- SoBeFree Announcement..... 6
- Plant Distribution Reports..... 7
- Botanical Literature... 7
- A Saving Moss 8

Identification of *Mentzelia* Species in New Mexico

Robert Sivinski

New Mexico Forestry Division, P.O. Box 1948, Santa Fe, NM 87504

The vernacular names of 'stickleaf' and 'blazingstar' are appropriate for the genus *Mentzelia* (Loasaceae). The gloccidiate leaf and stem hairs readily adhere to clothing and the radiating bright white or yellow petals and stamens of most of our species do not open until the late afternoon and evening hours. A child can press a corsage of flowering stickleaf twigs to his or her mother's blouse and a student of blazingstars must remain late in the field during long summer evenings after everyone else has gone home to dinner.

Three sections of the genus *Mentzelia* occur in New Mexico. Section *Trachyphytum* is represented by three short-lived, spring or early summer annuals with short (<6 mm) yellow petals. Section *Mentzelia* in New Mexico is also represented by three species, which have orangish flowers that are open during the day. All the remainder, most of our species, are vespertine-flowering, have winged seeds, and belong to the section *Bartonia*. Section *Bartonia* appears to be rapidly diversifying and its species are often not yet well sorted or easily distinguished. They are all highly variable and many exhibit overlapping or intermediate characteristics, which leads to difficulties in taxonomy and identification.

The New Mexican blazingstars are still being taxonomically revised by experts and I am reluctant to make a premature accounting of them. However, Kelly Allred asked me to construct a key to the New Mexican *Mentzelia* taxa, so the following is the taxonomic situation as I currently understand it.

Mentzelia in New Mexico

(+ = endemic to NM)

- 1 Seeds lenticular, narrowly winged; open petals white, cream-colored, or yellow and >6 mm long (outer petal surface of closed flower bud often tinged orange)
- 2 Tap rooted biennials or short-lived perennials (*nuda* and *strictissima*) without obvious woody bases; often tall or bushy plants with one or few stems from a rosette of leaves that wither when the plant matures
- 3 Open petals golden, lemon yellow or sulfur yellow
- 4 Leaves pinnately lobed to near the midribs (pinnatisect) with slender, linear to linear-oblong lobes that are often more than four times longer than broad
- 5 Petals <2.5 cm long...*M. laciniata* (Rydberg) J. Darlington CUTLEAF BLAZINGSTAR. Sandy clay soil in northwestern counties, mostly west of the continental divide.
- 5 Petals 2.5-4 cm long...+*M. conspicua* T.K. Todsen CHAMA BLAZINGSTAR. Endemic to sandy clay soil in the Chama River basin of Rio Arriba County.
- 4 Leaves sinuate, dentate, lacinate or pinnatifid but not with long linear lobes
- 6 Stem strict, usually >80 cm or more tall with flowering branches mostly above the middle... *M. rnsbyi* Wooton RUSBY'S BLAZINGSTAR. Piñon-juniper woodland and ponderosa forest in the mountains of the central and western regions.
- 6 Stem(s) branching (often broadly) above and below the middle, rarely >70 cm tall
- 7 Petals pubescent on outer surface...*M. marginata* (Osterhout) H.J. Thompson &

(Continued on page 2, *Mentzelia*)

Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus



(*Mentzelia*, continued from page 1)

- Prigge var. *cronquistii* (H.J. Thompson & Prigge) N.H. Holmgren & P.K. Holmgren CRONQUIST'S BLAZINGSTAR. Desert scrub, San Juan County.
- 7 Petals glabrous on outer surface
- 8 Filaments of fertile stamens in outer whorls broadly expanded, sometimes petaloid...*M. multiflora* (Nuttall) Gray ADONIS BLAZINGSTAR. Distributed state-wide with a bewildering array of variations in stature, leaf shape, flower size and shade, and capsule shape and size.
- 8 Filaments of all fertile stamens narrow, outer whorl filaments only slightly wider than those in inner whorls...*M. reverchonii* (Urban & Gilg) Thompson & Zavortink RERVERCHON'S BLAZINGSTAR. Northeastern counties near Texas border.
- 3 Open petals white or cream-colored
- 9 Petals 5-8 cm long, upper floral bract lacinate, growing from capsule wall...*M. decapetala* (Pursh ex Sims) Urban & Gilg ex Gilg GUMBO LILY. Shaley soil on eastern plains.
- 9 Petals <4 cm long; upper floral bract lacinate or entire, subtending the capsule
- 10 Petals 25-40 mm long; styles 12-25 mm long...*M. munda* (Pursh) Torrey & Gray GOODMOTHER. Northeastern plains and canyons.
- 10 Petals <25 mm long; style 7-12 mm long
- 11 Stems branching (often broadly) above and below the middle, usually <70 cm tall...*M. multiflora* (see lead 7, above).
- 11 Stems strict, usually 70-150 cm or more tall with flowering branches mostly above the middle
- 12 Biennial or more often short-lived perennial with 2 or more stems from the base...*M. strictissima* (Wooton & Standley) J. Darlington GRASSLAND BLAZINGSTAR. Sandy soils on southeastern plains.
- 12 Biennial, usually with a single stem...*M. rusbyi* Wooton (see lead 6 above).
- 2 Perennials with woody caudex branches clothed in persistent leaf bases or a woody multistemmed crown; sometimes with persistent basal leaves
- 13 Petals usually 3 mm or more wide, yellow or cream colored
- 14 Plants bushy with several slender (< 3 mm thick), wiry stems; petals and stamens bright lemon yellow; capsules narrow, more than two times longer than wide...*M. springeri* (Standley) Tidestrom SPRINGER'S BLAZINGSTAR. Endemic to volcanic pumice in piñon-juniper woodland or ponderosa forest in the Jemez Mountains.
- 14 Plants tufted or bushy, but with thicker, stiff stems; petals and stamens sulfur yellow, sometimes fading to cream colored after opening; capsules cup-shaped or broadly cylindric, usually less than two times longer than wide
- 15 Basal leaves usually persistent; stems usually one or a few, less than 30 cm tall...*M. pereunis* Wooton WOOTON'S BLAZINGSTAR. Endemic to sandy gypsum or caliche soils in the central and south-central regions.
- 15 Basal leaves withering, not persistent; stems usually several, 30-70 cm long ...*M. todiltoensis* N.D Atwood & S.L. Welsh TODILTO STICKLEAF. Endemic to outcrops of Todilto Gypsum in the central region.
- 13 Petals 1.2-2.5 mm wide, white
- 16 Leaves pinnatisect with widely spaced, narrow, linear lobes...*M. humilis* (Gray) J. Darlington var. *humilis* GYPSUM BLAZINGSTAR. Gypsum or caliche soils in the southeastern region.
- 16 Leaves dentate or pinnatisect with broad lobes that are widest at the base...*M. humilis* var. *guadalupeensis* Spellenberg GUADALUPE STICKLEAF. Endemic to outcrops of gypsum on the west slope of the Guadalupe Mountains in Otero County.
- 1 Seeds not lenticular or winged; open petals orange, orange-yellow, or if yellow then <6 mm long
- 17 Annuals; petals yellow, sometimes with darker red-orange at the base; placentae filiform; leaf blades not hastately lobed
- 18 Inflorescence bracts 2- to 6-toothed, with distinct whitish bases; leaves narrowly lanceolate to nearly linear, entire or with a few shallow lobes...*M. montana* (Davidson) Davidson VARIEGATED-BRACK BLAZINGSTAR. Foothills and canyons of southwestern and south-central mountains.
- 18 Inflorescence bracts entire or 2-toothed, entirely green or with a small whitish patch at the base; leaf blades pinatifid or entire
- 19 Leaves often pinnatifid, sometimes with several entire, narrowly lanceolate leaves; basal leaf rosette usually conspicuous...*M. albicaulis* Douglas ex Hooker WHITESTEM BLAZINGSTAR. Sandy plains and foothills of western half.
- 19 Leaves mostly ovate-lanceolate, entire or shallowly toothed; plants without a distinct basal rosette at maturity...*M. thompsonii* Glad THOMPSON'S STICKLEAF. Mancos and Fruitland shales, San Juan County.
- 17 Perennial or annual; petals orange or orange-yellow; placentae broad; most leaf blades hastately lobed
- 20 Herbaceous annual with slender tap root...*M. asperula* Wooton & Standley ORGAN MOUNTAIN BLAZINGSTAR. Rocky slopes of southern mountains.
- 20 Herbaceous perennial with a semi-woody crown and thick roots
- 21 Petals usually <10 mm long; capsules clavate, most reflexed, with 1-4 seeds...*M. oligosperma* Nuttall ex Simms CHICKEN-THIEF. Southern and eastern plains or rocky slopes.
- 21 Petals usually 12-15 mm long; capsules cylindric, erect, with about 10 seeds...*M. lindheimeri* Urban & Gilg LINDHEIMER'S BLAZINGSTAR. Rocky slopes of southwestern mountains.

(Continued on page 3, *Mentzelia*)



(*Mentzelia*, continued from page 2)

The New Mexican species of *Mentzelia* have recently been listed by Allred (2008). I am deviating somewhat from that list and should explain. The Intermountain Flora treatment of *Mentzelia* (Holmgren et al. 2005) has finally circumscribed *Mentzelia pumila* Nuttall ex Torrey & Gray var. *pumila* in enough detail to determine that it does not occur in New Mexico. New Mexican specimens identified as *pumila* are more consistent with *M. multiflora* in that the seeds of our plants have the broad wings of *multiflora* instead of the narrow wings of *pumila*. Christy (1998) also eliminated the use of *pumila* in Arizona in favor of *multiflora*.

The type of *Nuttallia procera* Wooton & Standley (syn = *Mentzelia pumila* var. *procera* (Wooton & Standley) J. Darlington) has the relatively narrow, somewhat acute petals of *pumila*, but it is a slender, small-flowered plant with very pale gray seeds that are broadly winged. The *procera* population in the Tularosa Basin plants seems discordant as a synonym of *M. multiflora* because of its somewhat smaller flowers and less deeply pinnatifid leaves, however, these differences are too indistinct to provide key characteristics to separate *procera* from *multiflora*. For now, I must leave them together as *multiflora*. John Schenk will better resolve the distributions and distinctions of these taxa in his PhD dissertation on the phylogeny of section *Bartonia* (in prep., University of Washington).

The Holmgrens (2004) also confined *Mentzelia integra* (M.E. Jones) Tidestrome (syn = *Mentzelia pumila* var. *integra* (M.E. Jones) Kearny) to southern Utah and northwestern Arizona. The New Mexico record of *integra* is based on misapplication of the name by Martin and Hutchins (1981) to *M. springeri* and occasional *multiflora* (or *procera*) specimens with less deeply-lobed leaves. There are a few *multiflora* populations in our northwestern and central counties with short, cup-shaped capsules somewhat similar to *integra*, but they lack the distinctive sparse pubescence of that species. These populations may have been the source of Darlington's (1934) inaccurate contention (without specimen citation) that *integra* occurs in northwestern New Mexico.

Wooton and Standley (1915) included *Mentzelia speciosa* Osterhout in the New Mexico flora and cited a Colfax County specimen collected by Wooton. This species is reported from southern Colorado (Harrington 1954, Weber and Wittmann 1996b) so could plausibly occur in adjacent New Mexico, but no authors since 1915 have extended its range to this state. I am unable to locate Wooton's specimen, but suspect it is the anonymous NMC specimen taken from Raton in 1900 and subsequently annotated by Henry Thompson as *M. multiflora*. *Mentzelia speciosa* has been ambiguously treated in various synonymies with the biennial *M. multiflora* (Darlington 1934, Harrington 1954) and the perennial *Mentzelia densa* (Greene) Greene (Weber and Wittmann 1996b) so the taxonomic circumscription of *speciosa* is currently confusing and poorly defined.

The scanty evidence thus far that it may occur in New Mexico is unconvincing and I have not followed the Wooton and Standley (1915) example of including *speciosa* in the state flora.

Finally, *M. lindheimeri* and *M. montana* are extended to southern New Mexico by Christy (1998), but without specimen citations. I cannot find specimens of either one at the UNM herbarium. *Mentzelia lindheimeri* would probably have been seen or collected in New Mexico on rocky slopes and canyons in Hidalgo County. Henry Thompson, a *Mentzelia* expert, has annotated three NMC specimens as *M. montana*. These are: *Wooton s.n.* (Organ Mountains, Doña Ana County); *Wooton s.n.* (near Rio Apache, Catron County); and *Metcalfe 51* (Gila River near Cliff, Grant County) (NMBCC 2009). UNM Herbarium contains numerous specimens that I cannot confidently place into either *M. montana* or *M. albicaulis*. Both appear to be intergrading throughout south-central and southwestern New Mexico and in the Jemez Mountains.

The above key to *Mentzelia* in New Mexico should serve to accurately place names on most of the populations and individual plants in the state. Yet there will be many cases when populations with obviously different morphologies will bear the same name, which is a less than satisfying result. For now, *M. multiflora* is the catch-all taxon for most of the odd biennial variants in the state and *M. perennis* is, likewise, the name most likely to be applied to the polymorphic yellow-flowered group of perennials on the gypsum and caliche substrates of central and south-central New Mexico.

I should also mention my dilemma with *Mentzelia cronquistii* H.J. Thompson & Prigge or *Mentzelia marginata* Osterhout in San Juan County. These taxa have pubescent petals and have been treated as species by Weber and Wittmann (1996a, as *Nuttallia* species), Christy (1998), and Welsh et al. (2003), but were recently made varieties of *M. marginata* by the Holmgrens (2004). All extended the distribution of *cronquistii* to northwestern New Mexico without specimen citation. The only New Mexican specimen I have seen with abaxially pubescent petals (*G.A. Marley 1840* UNM) has the narrow, almost linear cauline leaves of var. *cronquistii*, but the 5 petals and 5 petaloid outer stamens of var. *marginata*. Normally, I would give more taxonomic weight to flower characteristics than to leaf shape, but have only seen this one odd New Mexican specimen that is well outside the documented range of *marginata*. Plants with abaxially pubescent petals barely enter San Juan County and it is unlikely that both taxa are represented here, so I have conformed to the prevailing notion that only var. *cronquistii* occurs in New Mexico. Our single New Mexican specimen is also atypical in that the petals are greenish yellow and pubescent on both the abaxial and adaxial surfaces, which could be something new and undescribed.

Some progress is being made on the systematics of section *Bartonia* with DNA and cladistic analyses. John Schenk is finishing his dissertation on the phylogeny of this section and he

(Continued on page 4, *Mentzelia*)

Botany is the natural science that transmits the knowledge of plants.

— Linnaeus



(*Mentzelia*, continued from page 3)

and Larry Hufford are also preparing publications for at least two new species in New Mexico (personal communication). They should soon be bringing some important additions and clarification to our understanding of *Mentzelia* in New Mexico.

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Book Review: "Dry Storeroom No. 1: The Secret Life of the Natural History Museum"

By Richard Fortey

Alfred A. Knopf, New York, 335 pp.

"Fortey, senior paleontologist at the Natural History Museum in London, here turns his eye to the inner workings of a natural history museum. Though a paleontologist and an expert on trilobites, Fortey looks at all of the major departments of the museum, examining how they work, providing brief backgrounds on the sciences themselves, and telling stories of many of the museum's scientists both past and present. Explaining how science works through his stories from the museum, Fortey tells of truffles and how they illustrate the science of taxonomy; the Piltdown Man fraud and how more modern techniques exposed the hoax; how one of the ichthyologists found a lost Mozart manuscript while searching for a sixteenth-century book's illustration of a herring; and how the "First Law of Museums"—never throw anything away—turned up a cast of the Koh-i-noor diamond made before it was recut. Well illustrated with photos, this chatty book meanders from tale to tale in the endlessly fascinating manner of a good storyteller." — *Nancy Bent, Booklist*

"Fortey... in his affectionate portrayal of the institution in which he spent his working life... sneaks us behind the scenes with all the glee of a small child seeing for the first time the museum's iconic *Diplodocus* skeleton... always authoritative... the beauty of the book is that - just like a museum - you can visit the different sections in any order you choose, lingering in the places that most take your fancy... and there is plenty of solid science to enjoy, elucidated with brilliant flair." — *Sunday Times*

"Fortey has a scientist's regard for fact but a poet's delight in wonder. This is a rare intoxicating insight into a hidden community intent on unlocking the universe's myriad secrets." — *Metro*

"Engaging... Fortey's writing is enough to make the behind-the-scenes work of the museum totally fascinating... (his) delightful book, like the museum it describes, is both rambling and elegant." — *Sunday Telegraph*

"This book is worthy of the place it tells us about, and that is a pretty lofty chunk of praise." — *The Times*

"Richard Fortey's wonderful book... shows the unspectacular elements of the museum collection as the most interesting part of its work, while placing the well-known exhibits in a new and often comical light... with eccentricity flourishing unchecked among its staff Fortey has amassed a brilliant collection of anecdotes about their habits." — *Daily Telegraph*



Heuchera in New Mexico

by Patrick Alexander

Department of Biology, New Mexico State University, Las Cruces, NM 88003

This key is based primarily on the key to New Mexico *Heuchera* published in 2008 with the description of *Heuchera woodsiaphila* (Alexander 2008), with the addition of *H. hallii*, recently found in Colfax County, New Mexico (Hartman *et al.* 2006), but overlooked in preparation of the previous key. Examination of specimens of *H. hallii* kindly sent by Dr. Hartman also requires some reassessment of the affinities of *H. woodsiaphila* of the Capitan Mountains. Based on the most recent comprehensive treatment of the genus (Rosendahl *et al.* 1936), *H. woodsiaphila* is a member of *Heuchera* section *Holochloa* subsection *Cylindrica*, which is separated from section *Holochloa* subsection *Novomexicanae* primarily by having apetalous flowers greater than 5 mm long. Subsection *Cylindrica* is composed of several species of the northwestern United States, of which the nearest populations to New Mexico occur in northeastern Nevada. However, in comparing *H. woodsiaphila* to *H. hallii* of subsection *Novomexicanae* I find the two essentially indistinguishable except that petals are absent in the former and present in the latter. This suggests that *H. woodsiaphila* fits the normal pattern of endemics to the greater Sacramento Mountains, being closely allied to species of the Rocky Mountains, rather than being a wide disjunct from a group of species otherwise found far to the northwest. However, more reliable resolution of infrageneric taxa in *Heuchera* awaits a much-needed phylogenetic analysis of the genus.

Heuchera

[for Johann Heinrich von Heucher (1677-1747), German professor of medicine and botany at Wittenberg, specializing in medicinal plants]

- 1 Stamens equal to or exceeding the sepals
 - 2 Inflorescence panicle-like, open...*H. rubescens* Torrey PINK ALUMROOT. Crevices of rocky cliffs and outcrops in the mountains.
 - 2 Inflorescence raceme-like, narrow...*H. pulchella* Wooton & Standley SANDIA ALUMROOT. Endemic to New Mexico, limestone cliffs in the Sandia and Manzano Mountains.
- 1 Stamens shorter than the sepals
 - 3 Flowers deep pink to red...*H. sanguinea* Engelm CORAL-BELLS. Moist, shaded, rocky places in the southwestern mountains.
 - 3 Flowers greenish white to yellowish
 - 4 Hypanthia deeply campanulate; petals erect and shorter than to equalling the sepals, or absent
 - 5 Sepals 2.5--4 mm long
 - 6 Petals absent...*H. woodsiaphila* P.J.Alexander CAPITAN ALUMROOT. Forested granitic talus, known only from the Capitan Mountains.
 - 6 Petals present...*H. hallii* Gray FRONT RANGE ALUMROOT. Stream banks and moist rocky outcrops in the northern mountains, as yet known only from Colfax County.
 - 5 Sepals less than 2 mm long
 - 7 Sepals glandular-puberulent, the longest hairs ≤ 0.2 mm...*H. novomexicana* Wheelock NEW MEXICO ALUMROOT. Rocky mountain slopes and ledges.
 - 7 Sepals glandular-hirsute, the longest hairs 0.3--0.6 mm long...*H. glomerulata* Rosendahl, Butters, & Lakela CHIRICAHUA ALUMROOT. Shaded rocky slopes in the mountains of the bootheel region.
 - 4 Hypanthia shallow, saucer-shaped; petals spreading, usually longer than the sepals, rarely equaling them
 - 8 Petioles hirsute with long, spreading, gland-tipped hairs to 3--6 mm long as well as glandular-puberulent...*H. wootonii* Rydberg WOOTON'S ALUMROOT. Endemic to New Mexico, rocky outcrops and brushy mountain slopes in Catron, Lincoln, and Otero counties.
 - 8 Petioles glandular-puberulent only, without long, spreading hairs...*H. parvifolia* Nuttall ex Torrey & Gray LITTLE-LEAF ALUMROOT. Rock outcrops and crevices of ledges and cliffs in the mountains.

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Founded in 1996, SO BE FREE (SPRING OUTING, BOTANICAL EXCURSION, FORAY, RETREAT, AND ESCAPE TO THE ENVIRONMENT!) is a series of Western Bryological Forays started by the Bryolab at UC Berkeley, but open to all botanists. The main focus is on bryophytes, but we also encourage experts on other groups to come along and smell the liverworts. We welcome specialists and generalists, professionals and amateurs, master bryologists and rank beginners. SO BE FREE is held each spring, somewhere in the Western U.S., associated with spring break at universities. The usual tradition is to have a four-day, three-night schedule with communal meals, in inexpensive and remote locations. Evening slide shows and informal talks are presented as well as keying sessions with microscopes. In addition to seeing interesting wild areas and learning new plants, important goals for SO BE FREE include keeping western bryologists (and friends) in touch with each other and teaching beginners. For glimpses of the past outings, consult the SO BE FREE web site: <http://ucjeps.berkeley.edu/bryolab/trips/sobefree.php>.

The 2010 SO BE FREE will be held in the Sacramento Mountains in south-central New Mexico, not far from White Sands National Monument and the Trinity Site of atomic bomb fame. The Sacramento Mountains range from 4500 ft in the foothills to nearly 12,000 ft at nearby Sierra Blanca. The mountains are surrounded by Chihuahuan Desert and short-grass plains. The area is rather dry southern Rocky Mountain vegetation, with woodlands and savannahs at the lower elevations, ranging through coniferous forests at mid-elevations, to subalpine forests at the highest elevations. We will visit sites mostly in the mountains, at springs, seeps, and shaded north-slopes, but hope to have a trip to the Chihuahuan Desert to examine biological soil crusts in the White Sands. Beginning bryologists are welcome. We will provide special learning activities for beginners, as well as general field trips for all, from novice to specialist.

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Mail this form, with check made out to Range Science Herbarium, to _____
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All arrangements are being made by Kelly Allred. Contact me with questions: kallred@nmsu.edu

Do NOT contact Sacramento Methodist Assembly for reservations.

Kelly Allred – SOBEFREE
New Mexico State University
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Las Cruces, NM 88003



Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Ken Heil [San Juan College, 4601 College Blvd., Farmington, NM 87402] & Steve O'Kane Jr. [University of Northern Iowa, 1227 W. 27th St., Cedar Falls, IA 50614]

Elatine chilensis A. Gray (Elatinaceae, waterwort): Taos County: State hwy 567, about 2.5 miles east of US 285, N 36°21.760' W 105°51.026, stock pond above large ravine, 7100 ft, 20 June 2008, Ken Heil 29439, with Steve O'Kane & Wayne Mietty (SJNM).

— Richard Worthington [PO Box 13331, El Paso, TX 79912]

Cyperus pseudothyrsiflorus (Kukenthal) R. Carter & S. D. Jones (Cyperaceae): Doña Ana County: Organ Mts, 0.3 air miles north from top of Organ Needle (south of Aguirre Springs and upper Pine Tree Trail), T22S, R4E, Sec. 32, NW of SW, 7500-8000 ft, 29 Aug 1992, Worthington, R.D. 21452 (UTEP, SAT, NMC).

— Kelly Allred [Dept. Animal & Range Sciences, New Mexico State Univ., Las Cruces, NM 88003]

**Cylindropuntia bigelovii* (Engelmann) F.N. Knuth (Cactaceae, teddy-bear cholla): Doña Ana County: Las Cruces, Las Alturas subdivision, undeveloped land among the residential properties, adjacent to and west of Maxim Court, N32° 15.633' W 106° 43.294, Chihuahuan Desert scrub and wash vegetation with mesquite and desert willow, sandy ground, 4020 ft, small

population of about 15 plants, photos by Allred, no specimens taken.



**Rauvolfia acris* Linnaeus: Catron County: Gila National Forest, Glenwood Fish Hatchery, Glenwood, plants 2 to 4 ft tall,

flowers yellow, small stream and ponds at hatchery, at edge of water, 4 June 1965, J.R. Crutchfield 121 (NY) (Det. B. Ertter). [This marks the first verified specimen of this species from New Mexico. The specimen may be viewed at the New York Botanical Garden Virtual Herbarium website—<http://sciweb.nybg.org/science2/hcol/allvase/index.asp>. Thanks to Pat Holmgren for calling this to our attention.]

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Gernandt, D.S., S. Hernandez-Leon, E. Salgado-Hernandez, & J.A. Perez de la Rosa. 2009. **Phylogenetic relationships of *Pinus* subsection *Ponderosae* inferred from rapidly evolving cpDNA regions.** *Syst. Bot.* 34(3):481-491. [evidence in favor of elevating var. *scopulorum* & var. *arizonica* to specific rank]

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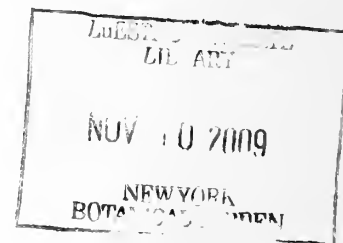
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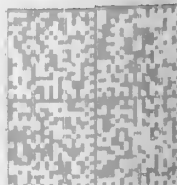
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